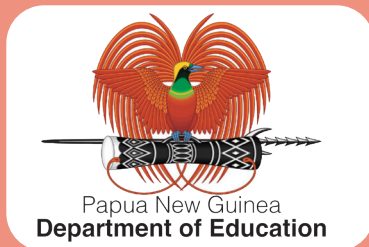


$$+ 1 = 2 \quad 4 - 6 \div 8 + 0 =$$
$$3 + 5 \div 7 - 9 =$$

National MATHEMATICS Textbook



Grade 3



Issued free to schools by the Department of Education

First Edition

Published in 2019 by the Department of Education, Papua New Guinea.

© Copyright 2019, Department of Education, Papua New Guinea.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted by any form or by any means of electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher.

ISBN 978-9980-905-09-3

Acknowledgements

The Grade 3 National Mathematics Textbook was developed by the Curriculum Development Division in partnership with the Mathematics specialists from Japan through the Project for Improving the Quality of Mathematics and Science Education also known as QUIS-ME Project.

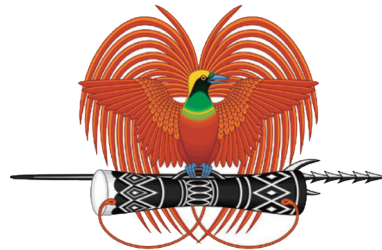
The Mathematics curriculum officers, textbook writers, pilot teachers from NCD and Central Provinces and the Subject Curriculum Group (SCG) are acknowledged for their contribution in writing, piloting and validating this textbook.

The Curriculum Panel members, members of the Subject Advisory Committee (SAC) and the Basic Education Board of Studies (BEBOS) are also acknowledged for their advice, recommendation and endorsement of this textbook.

A special acknowledgement is given to the People and the Government of Japan for the partnership and support in funding and expertise through Japan International Cooperation Agency (JICA) - QUIS-ME Project with Curriculum Development Division (CDD).

National Mathematics Textbook

Grade 3



Papua New Guinea
Department of Education



Minister's Message

Dear Grade 3 Students,

I am honoured to give you my message in this National Mathematics Textbook.

The Government of Papua New Guinea has been working to improve students' learning of mathematics. This textbook was developed by our excellent Curriculum Officers, Textbook Writers and Pilot Teachers, who have worked together with Japanese specialists for three years. This is the best textbook for grade 3 students in Papua New Guinea and is comparable to international standards. I would like to thank the Government of Japan for its support in improving the quality of learning for children in Papua New Guinea.

I am excited about this textbook because it covers all topics necessary for learning in grade 3. You will find many photographs, illustrations, charts and diagrams that are interesting and exciting for learning. I hope they will motivate you to explore more about mathematics.

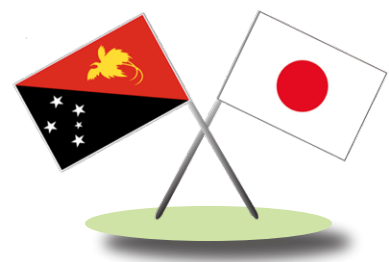
Students, Mathematics is a very important subject. It is also very interesting to learn. Do you know why? Because mathematics is everywhere in our lives. You will use your knowledge and skills of mathematics to calculate cost, to find time, distance, weight, area, and many more. In addition, mathematics will help you to develop your thinking skills, such as how to solve problems using a step-by-step process.

I encourage you to be committed, enjoy and love mathematics, because one day in the future you will be a very important person, participating in developing and looking after this very beautiful country of ours and improving the quality of living.

I wish you a happy and fun learning experience with Mathematics.



Hon. Nick Kuman, B.ApSci.UWSyd, MP
Minister of Education



Message from the Ambassador of Japan

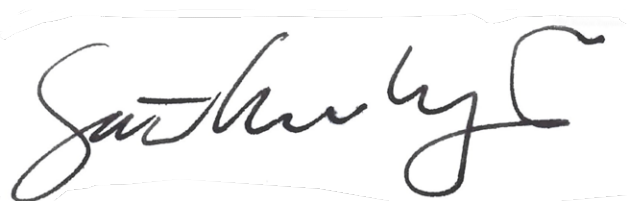
Greetings to Grade 3 Students of Papua New Guinea!

It is a great pleasure that the Department of Education of Papua New Guinea and the Government of Japan worked together to publish national textbooks on mathematics for the first time.

The officers of the Curriculum Development Division of the Department of Education made full efforts to publish this textbook with Japanese math experts. To be good at mathematics, you need to keep studying with this textbook. In this textbook, you will learn many things about mathematics with a lot of fun and interest, and you will find it useful in your daily life. This textbook is made not only for you but also for the future students.

You will be able to think much better and smarter if you gain more knowledge on numbers and diagrams through learning mathematics. I hope that this textbook will enable you to enjoy learning mathematics and enrich your life from now on. Papua New Guinea has a big national land with plenty of natural resources, and a great chance for a better life and progress. I hope that each of you will make full use of knowledge you obtained and play an important role in realising such potential.

I am honoured that, through the publication of this textbook, Japan helped your country develop mathematics education and improve your ability, which is essential for the future of Papua New Guinea. I sincerely hope that, through the teamwork between your country and Japan, our friendship will last forever.



Satoshi Nakajima

Ambassador of Japan to Papua New Guinea

Share ideas with your friend!



Let's learn Mathematics, it's fun!

Secretary's Message



Dear students,

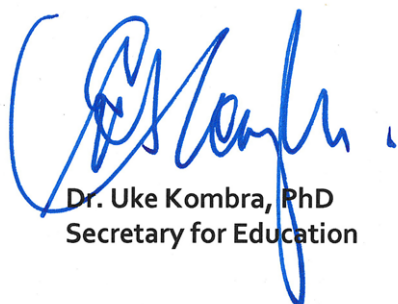
This is your Mathematics Textbook that you will use in Grade 3. It contains very interesting and enjoyable activities that you will be learning in your daily Mathematics lessons.

In our everyday lives, we come across many Mathematical related situations such as buying and selling, making and comparing shapes and their sizes, travelling distances with time and cost, and many more. These situations require mathematical thinking processes and strategies to be used.

This textbook provides you with a variety of mathematical activities and ideas that are interactive and allow you to learn with your teacher or on your own as an independent learner. Key concepts for each topic are highlighted in the summary notes at the end of each chapter. The mathematical skills and processes are expected to be used as learning tools to understand the concepts given in each unit or topic and apply these in solving problems.

You are encouraged to be like a young Mathematician who learns and is competent in solving problems and issues that are happening in the world today. You are also encouraged to practice what you learn everyday both in school and at home with your family and friends.

I wish you all the best in studying Mathematics using this textbook.



Dr. Uke Kombra, PhD
Secretary for Education

Friends learning together in this textbook



Mero



Naiko



Sare



Gawi



Kapi
(Kapul)



Kekeni



Ambai



Vavi



Yamo



Koko
(Kokomo)

Symbols in this textbook



- Discovered Important Ideas



- Important definition or terms.



- What we will do in the next activity.



- When you lose your way, refer to the page number given.



- You can use your calculator here.



- Practice by yourself. Fill in your copy.



- New knowledge to apply in daily life



- Let's do the exercise.



- Let's do mathematical activities by students

$$6 = \square \times \square$$

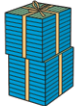



- Let's fill numbers in and complete the expression to get the page number

What We Learned In Elementary School

Numbers and Calculations

2nd grade

Numbers up to 10000

Thousands place	Hundreds place	Tens place	Ones Place
			
two thousand	three hundred	Forty	Six
2	3	4	6

The number for 10 sets of 1000 is called "ten thousand" and written as 10000.



The numbers of two thousand, three hundred and forty six altogether is "two thousand three hundred and forty six". It is written as 2346.

Multiplication

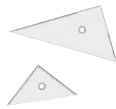
2nd grade

Multiplication Table

Mathematical sentence for multiplication is
(Number for each set)
× (number of sets)
= (Total number).



	1	2	3	4	5	6	7	8	9
1 row of	1	2	3	4	5	6	7	8	9
2 row of	2	4	6	8	10	12	14	16	18
3 row of	3	6	9	12	15	18	21	24	27
4 row of	4	8	12	16	20	24	28	32	36
5 row of	5	10	15	20	25	30	35	40	45
6 row of	6	12	18	24	30	36	42	48	54
7 row of	7	14	21	28	35	42	49	56	63
8 row of	8	16	24	32	40	48	56	64	72
9 row of	9	18	27	36	45	54	63	72	81



Addition in Vertical Form

2nd grade

How to Add 38+27 Using the Vertical Form



$$\begin{array}{r} 38 \\ + 27 \\ \hline \end{array}$$

Write same place values in the same column. Add the ones place first.

$$\begin{array}{r} \text{Ones place} \\ 38 \\ + 27 \\ \hline 15 \end{array}$$

$8+7=15$
The ones place is 5.
Carry 1 ten to the tens place.

$$\begin{array}{r} \text{Tens place} \\ 38 \\ + 27 \\ \hline 65 \end{array}$$

1 ten was carried, so $3+2+1=6$.
The tens place is 6.



Measurement Duration and Time

2nd grade

1 hour = 60 minutes 1 day = 24 hours



Subtraction in Vertical Form

2nd grade

How to Subtract 45-27 with the Vertical Form

$$\begin{array}{r} 45 \\ - 27 \\ \hline \end{array}$$

Write the numbers in each column.

$$\begin{array}{r} \text{Ones place} \\ 3 \text{ 10} \\ 45 \\ - 27 \\ \hline 8 \end{array}$$

Borrow 1 ten as 10 ones, so $15-7=8$.
The ones place of the answer becomes 8.

$$\begin{array}{r} \text{Tens place} \\ 3 \text{ 10} \\ 45 \\ - 27 \\ \hline 18 \end{array}$$

1 ten has been borrowed to the ones place, so $3-2=1$.



Shapes

1st grade

Making Shapes

It looks like a car.

It looks like a puppy.

We drew many pictures through tracing shapes.

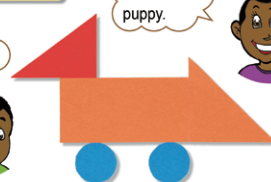


Table of Contents

Numbers and Operation

Grade 2

Addition with the vertical form
Subtraction with the vertical form



1 Addition and Subtraction 1	2
(1) What We Learned in Elementary School	2

2 Addition and Subtraction 2	26
(1) Addition of 3-digit Numbers	26
(2) Subtraction of 3-digit Numbers	31
(3) Calculating Larger Numbers	36
(4) Considering How to Calculate More Easily	37
(5) What Kind of Calculation is This?	39

Grade 2

Multiplication



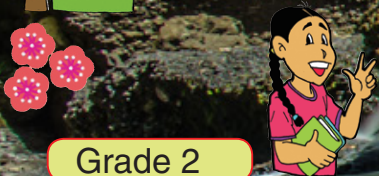
3 Multiplication 1	42
(1) What We Learned in Elementary School	42

4 Multiplication 2	49
(1) Rules of Multiplication	49
(2) Multiplication with 0	54
(3) Multiplication with 10	57

5 Thinking about How to Calculate 60

Grade 2

Time and Duration



6 Duration and Time	62
(1) Short Duration	62
(2) Duration and Time	65

12 Length	123
(1) How to Measure	125
(2) Kilometre	127

Measurement

13 Triangles	133
(1) Isosceles and Equilateral Triangles	134
(2) How to Draw Triangles	138
(3) Triangles and Angles	140
(4) Designing Patterns	142

Data and Mathematical Relation

14 Tables and Graphs	145
(1) Tables	146
(2) Bar Graphs	147
(3) Combining Tables	152

Geometric Figures

15 Multiplication of 2-digit Numbers	157
(1) Multiplication by 20, 30 ,..... 90	157
(2) How to Calculate (2-digit numbers) × (2-digit numbers)	159
(3) How to Calculate (3-digit numbers) × (2-digit numbers)	162



Grade 4

- | | | |
|-------------------------------------|---------------------------------|--|
| (1) Large Numbers | (7) Division by 2-digit Numbers | (14) Thinking about How to calculate |
| (2) Division | (8) Line Graph | (15) Arrangement of Data |
| (3) Thinking about How to Calculate | (9) Decimal Numbers 1 | (16) Multiplication and Division of Decimal number |
| (4) Angles | (10) Round Numbers | (17) Fractions |
| (5) Division by 1-digit Numbers | (11) Expressions and Calculate | (18) Rectangular Prisms and Cubes |
| (6) Quadrilaterals | (12) Area | (19) Quantities Change together |
| | (13) Decimal Numbers 2 | (20) Summary of Grade 4 |

7 Multiplication in Vertical Form

- | | |
|---|----|
| (1) Multiplication with Tens and Hundreds | 69 |
| (2) How to Calculate (2-digit numbers) × (1-digit number) | 69 |
| (3) How to Calculate (3-digit numbers) × (1-digit number) | 74 |
| (4) Mental Calculation | 76 |



8 Division

- | | |
|--------------------------------|----|
| (1) Division | 80 |
| (2) Division with 1 and 0 | 82 |
| (3) Using Rules of Calculation | 89 |
| | 90 |

9 Division with Remainders

- | | |
|----------------------------------|----|
| (1) Division with Remainders | 93 |
| (2) Let's Solve Various Problems | 96 |

Geometric Figures

10 Circles and Spheres

- | | |
|-------------|-----|
| (1) Circles | 99 |
| (2) Spheres | 100 |
| | 105 |

11 Large Numbers

- | | |
|---|-----|
| (1) Ten and Hundred Thousand Place | 109 |
| (2) The Structure of Large Numbers | 109 |
| (3) 10 Times, 100 Times and Divided by 10 | 113 |
| (4) Addition and Subtraction | 117 |
| | 119 |

Grade 1

Shapes

Grade 2

Number with 1000

16 Weight

- | | |
|-----------------------------|-----|
| (1) How to Represent Weight | 168 |
| (2) Calculation of Weight | 168 |
| | 175 |

17 Fractions

- | | |
|---|-----|
| (1) Fractions | 177 |
| (2) Structure of Fractions | 177 |
| (3) Addition and Subtraction of Fractions | 182 |
| | 183 |

18 Math Sentences Using the

- | | |
|--------------------------------------|-----|
| (1) Math Sentences of Addition | 186 |
| (2) Math Sentences of Multiplication | 188 |
| | 190 |

19 Using Money in Our Life

- | | |
|-----------------------|-----|
| (1) Price and Coins | 193 |
| (2) Unit for Currency | 193 |
| | 199 |

20 Summary of Grade 3

203

Making Tapes 166

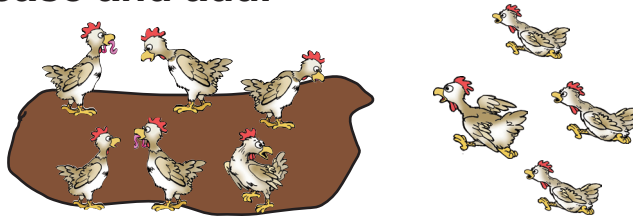


1 What We Learned in Elementary School

1 Addition Story

1 Let's make mathematics stories using such words as **in total**, **altogether**, **more**, **increase** and **add**.

1 A mathematics story for $6 + 4$.

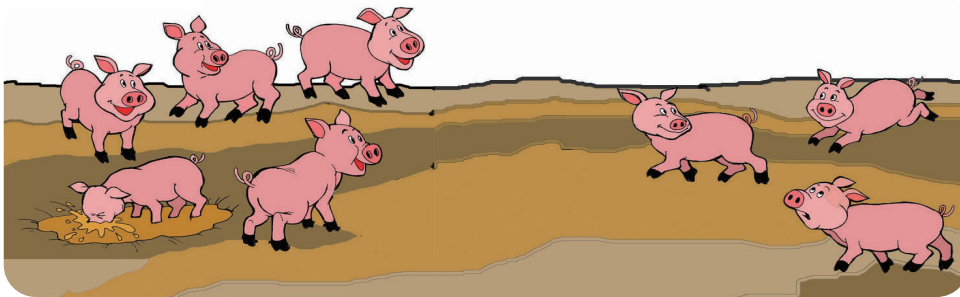


There are a group of chickens. chickens are added to the group. How many chickens are there in ?

The number of chickens was at first. The number of chickens was increased by .

How many chickens are there?

2 A mathematics story for $5 + 3$.



There are pigs and pigs.

How many pigs are there ?

2 Let's make various mathematics stories for the following.

1 $4 + 5$

2 $4 + 3$

3 $6 + 3 + 1$

$2 = \square + \square$

Addition Cards

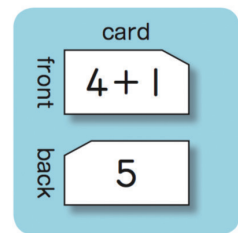
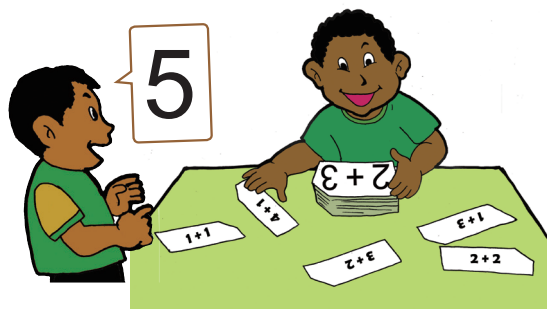
3 Let's play a fun game to master addition using addition cards.

Enjoying addition cards game.



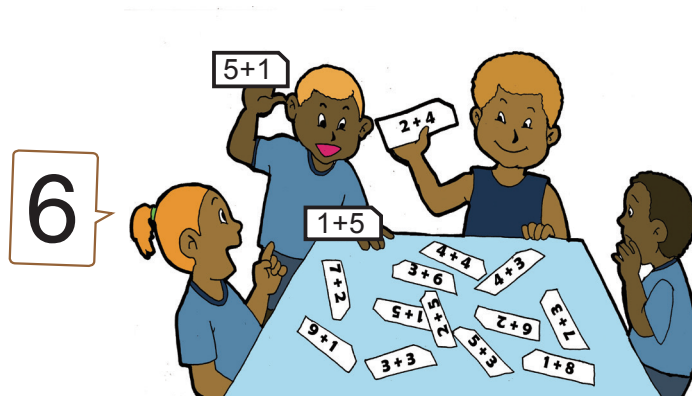
1 Use addition cards of answers up to 10.

In pairs, one student points to a card with a mathematic expression, and the friend says the answer.



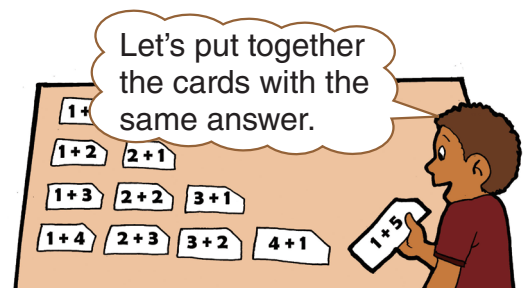
2 Make groups of 4 or 5. Group leader calls a number.

Other members find the cards with the expression of same answer.



3 Line up the cards that have the same answer.

Arrange the cards in order and identify the pattern.



4 Let's play making 10 by adding two numbers.



Teacher shows a number.

1 Look at the teacher's flash card from 1 to 9 and add a number to make 10

2 Look at the blocks and fill numbers in and to make 10.

	<input type="text" value="9"/> and <input type="text" value="1"/>	→	<table border="1"><tr><td colspan="2">10</td></tr><tr><td>9</td><td>1</td></tr></table>	10		9	1
10							
9	1						
	<input type="text" value="8"/> and <input type="text" value="2"/>	→	<table border="1"><tr><td colspan="2">10</td></tr><tr><td>8</td><td>2</td></tr></table>	10		8	2
10							
8	2						
	<input type="text"/> and <input type="text"/>		<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>
10							
<input type="text"/>	<input type="text"/>						
	<input type="text"/> and <input type="text"/>		<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>
10							
<input type="text"/>	<input type="text"/>						
	<input type="text"/> and <input type="text"/>		<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>
10							
<input type="text"/>	<input type="text"/>						

3 Let's find other cases to make 10. How do you find all cases?

<input type="text" value="2"/> and <input type="text" value="8"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td>2</td><td>8</td></tr></table>	10		2	8	<input type="text" value="9"/> and <input type="text" value="1"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td>9</td><td>1</td></tr></table>	10		9	1
10											
2	8										
10											
9	1										
<input type="text"/> and <input type="text"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>	<input type="text"/> and <input type="text"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>
10											
<input type="text"/>	<input type="text"/>										
10											
<input type="text"/>	<input type="text"/>										
<input type="text"/> and <input type="text"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>	<input type="text"/> and <input type="text"/>	<table border="1"><tr><td colspan="2">10</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td></tr></table>	10		<input type="text"/>	<input type="text"/>
10											
<input type="text"/>	<input type="text"/>										
10											
<input type="text"/>	<input type="text"/>										

4 Let's add and find the same answers.

- | | | |
|-------|-------|-------|
| ① 3+6 | ② 6+4 | ③ 6+0 |
| ④ 2+8 | ⑤ 7+3 | ⑥ 4+6 |

4 = +



Homework



Let's try T-Math calculation!!
T-Math is a Table-Mathematics. You can find pattern of answers. It is so amazing! All the best! Have fun!

Remember!!

6 + 2, we call that
6 is **Augends** and
2 is **Addends**



- 1 Let's fill in the answer for addition, (augend) + (addend), in the following T-Math.

T-Math Addition		Addends									
		1	2	3	4	5	6	7	8	9	10
Augends	1	2		4		6		8		10	
	2	3	4		6		8		10		
	3			6				10	11		
	4	5	6								
	5					10					
	6	7	8								
	7										
	8	9	10								
	9									18	
	10										

- 2 Let's fill in answers for addition in the following T-Math.

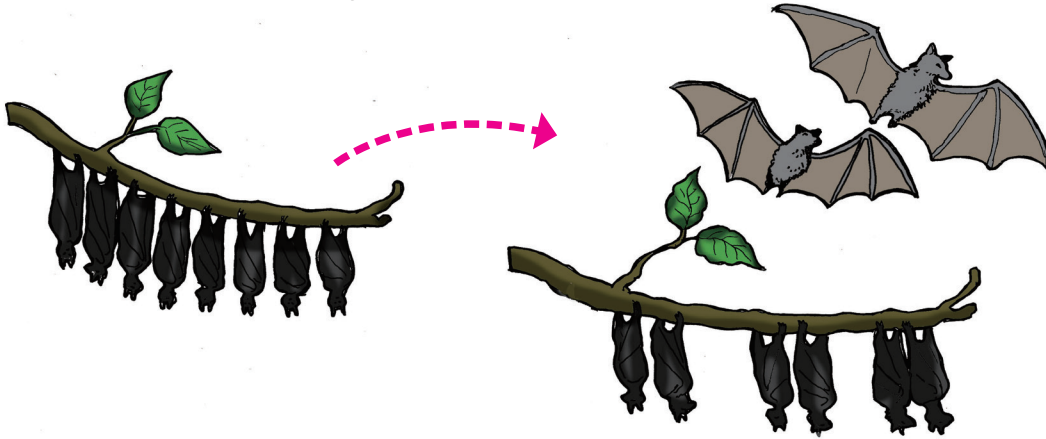
T-Math Addition		Addends									
		1	2	3	9	10	5	6	7	8	4
Augends	7										
	4	5	6								8
	3			6					10	11	
	9				18						
	10										
	5						10				
	6	7	8								
	2	3	4					8		10	6
	8	9	10								
	1	2		4	10		6		8		

- 3 Let's compare the tables 1 and 2 and explain how to tell the difference.

Subtraction story

5 Let's make mathematics stories using words such as left, remain, decrease, more, less and difference.

1 A mathematics story for $8 - 2$.



There are flying foxes hanging on the tree.

flying foxes flew away.

How many flying foxes are ?

There are flying foxes hanging on the tree.

The number of flying foxes decreased by .

How many flying foxes ?

2 A mathematics story for $9 - 6$

There are girls and boys.

What is the difference between the number of girls and boys?

There are pencils and there are pens.

How many pens are there than pencils?

6 Let's make various mathematics stories for the following:

1 $8 - 5$

2 $10 - 7$

3 $3 + 7 - 7$

4 $12 - 7$

5 $12 - 5 - 2$

$6 = \square + \square$

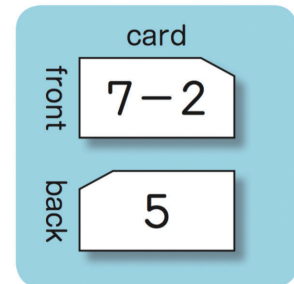
Subtraction Cards

7 Let's play a fun game to master subtraction using subtraction cards.

Enjoy playing subtraction cards game!



- Use subtraction cards of which minuends are up to 10. In pairs, one student shows a card and the friend says the answer.

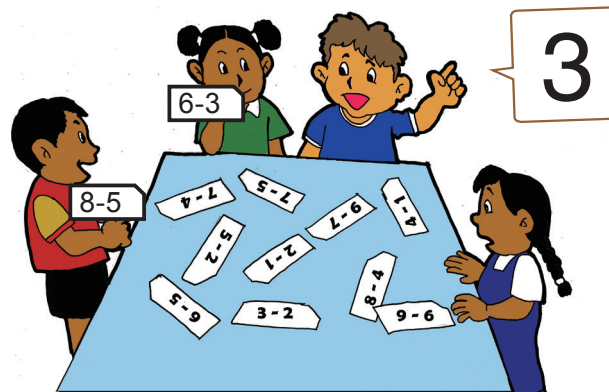


Remember

$7 - 2 = 5$

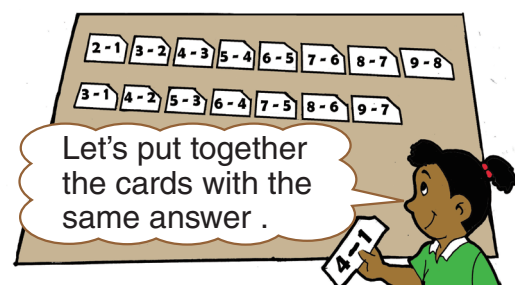
↑ ↙ Subtrahend
Minuend

- Make groups of 4 or 5. Group leader calls a number. Members find the cards with the same answer.



- Line up the cards that have the same answer.

Let's explain your arrangement of cards which have the same answer.





Remember!!
 7 – 3, we call that
 7 is **Minuends** and
 3 is **Subtrahends**



- 1 Let's fill in the answers for subtraction, (minuend) – (subtrahend), in the following T-Math.

T-Math Subtraction		Subtrahends									
		1	2	3	4	5	6	7	8	9	10
Minuends	1	0	-	-	-	-	-	-	-	-	-
	2		0	-	-	-	-	-	-	-	-
	3	2		0	-	-	-	-	-	-	-
	4		2		0	-	-	-	-	-	-
	5	4		2		0	-	-	-	-	-
	6										
	7	6									
	8										
	9	8								0	
	10										

- 2 Let's fill in the answers for subtraction in the following T-Math.


T-Math Subtraction		Subtrahends									
		1	2	3	9	5	6	7	10	8	4
Minuends	7							0		-	
	4									-	0
	3			0						-	
	9				0						
	5					0				-	
	6						0			-	
	2		0							-	
	8									0	
	10								0		
	1	0	-	-	-	-	-	-	-	-	-

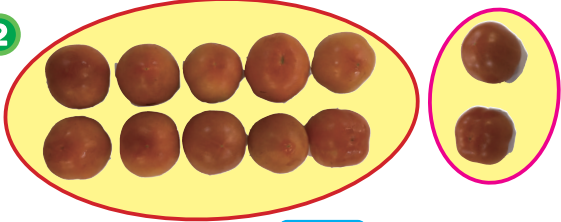
- 3 Let's compare the tables 1 and 2 and explain how to develop T-Math table for subtraction.

8 = □ + □

Hundreds, tens and ones

8 How many are there?

1 
 eggs

2 
 tomatoes

3 
 sheets

9 Fill in each with a number.


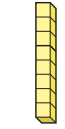
- 1** 3 tens and 7 ones make .
- 2** 25 is made up of tens and ones.
- 3** 4 tens and ones makes 46.
- 4** 40 is made up of tens.

Remember.
This is called block diagram.

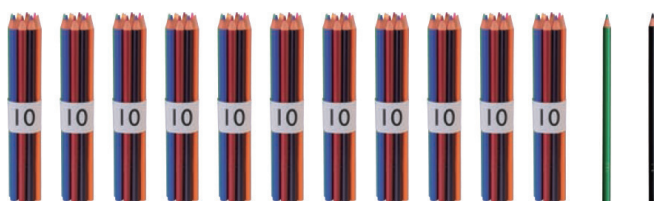
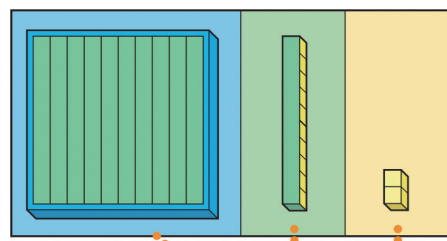


10 Let's fill in the with a number.


 sets of 10 tomatoes and tomatoes.

Room for plates	Room for singles
	
Tens place	Ones place
2	8
<input type="text"/> 28	

11 How many pencils are there?

Mental Addition

This is very interesting and important skills for daily life. Let's master mental calculation.

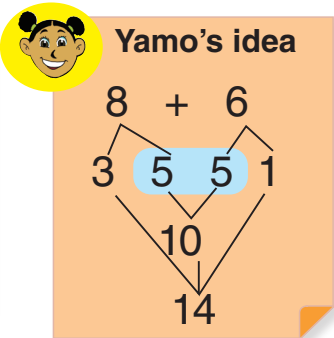
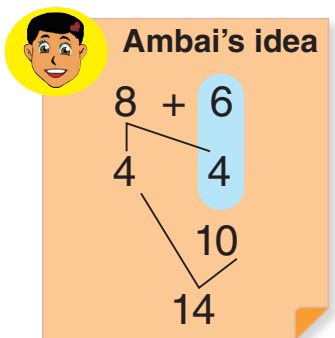
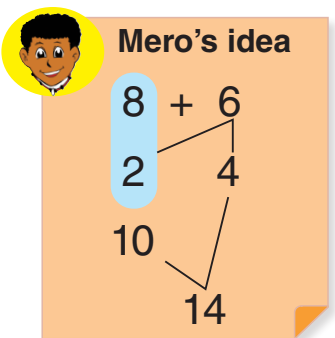


12 Think about how to calculate $8 + 6$ in your mind.

I made 10 from 8, so removed 2 from 6. Finally I added the left 4.

I made 10 from 6, so I removed 4 from 8.

I made 10 by removing 5 each from 8 and 6.



13 Let's calculate using the ideas above.

- ① $7 + 6$
- ② $8 + 9$
- ③ $9 + 6$

Don't use your fingers. Calculate in your mind quickly by making 10



14 Find the answers mentally and explain.

- ① $9 + 4$
- ② $8 + 3$
- ③ $7 + 5$
- ④ $6 + 5$
- ⑤ $3 + 9$
- ⑥ $5 + 6$
- ⑦ $4 + 7$
- ⑧ $5 + 8$

15 Let's fill in the addition cards.

$9 + 9$	$8 + 9$	$7 + 9$	$6 + 9$				$2 + 9$
$9 + 8$		$7 + 8$			$4 + 8$		
$9 + 7$	$8 + 7$	$7 + 7$			$4 + 7$		
$9 + 6$	$8 + 6$			$5 + 6$			
		$7 + 4$					
	$8 + 3$						
$9 + 2$							

Give the answers for addition cards. Let's fill in the blank cards. Which place do you fill in first? Explain the ways of the arrangements.



- 1 Let's fill in the addition expression in the following T-Math and say the answer.

T-Math Addition		Addends											
		1	2	3	4	5	6	7	8	9	10		
Augends	1	1+1	1+2										
	2	2+1											
	3												
	4												
	5												
	6												
	7												
	8												
	9												
	10												

- 2 After filling in the expressions in the following T-Math 1, let's colour yellow when the answers of expressions are 10 and colour green when the answers of expressions are 14.

T-Math Addition		Addends												
		1	2	3	4	5	6	7	8	9	10			
Augends	1	1+1	1+2											
	2	2+1												
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													

Mental Subtraction

16 Think about how to calculate $14 - 6$ in your mind.



Sare's idea

$$\begin{array}{c}
 14 - 6 \\
 \swarrow \quad \searrow \\
 4 \quad 10 - 6 = 4 \\
 \swarrow \quad \searrow \\
 8
 \end{array}$$



Kekeni's idea

$$\begin{array}{c}
 14 - 6 \\
 \swarrow \quad \searrow \\
 14 - 4 = 10 \quad 2 \\
 \vdots \quad \vdots \\
 10 - 2 = 8
 \end{array}$$



It's easy to subtract from 10. I splitted 14 between 10 and 4. I subtracted 6 from the 10 splitted. I got 4 and added to the splitted 4.

I wanted to subtract 4 from 14, so that I get 10. I subtracted, 2 more from the 10, so that I have subtracted 6 in total.



17 Let's calculate using the ideas above.

1 $11 - 4$

2 $13 - 9$

3 $17 - 8$

18 Find the answer and explain how to calculate.

1 $17 - 9$

2 $15 - 7$

3 $13 - 6$

4 $12 - 7$

5 $11 - 5$

6 $11 - 8$

7 $12 - 8$

8 $16 - 8$

19 Let's fill in the subtraction cards.

$11 - 2$	$12 - 3$	$13 - 4$	$14 - 5$	$15 - 6$	$16 - 7$	$17 - 8$	<input type="text"/>
$11 - 3$	<input type="text"/>	$13 - 5$	$14 - 6$	$15 - 7$	$16 - 8$	$17 - 9$	
$11 - 4$	$12 - 5$	$13 - 6$	$14 - 7$	$15 - 8$	$16 - 9$		
$11 - 5$	$12 - 6$	$13 - 7$	<input type="text"/>	$15 - 9$			
$11 - 6$	$12 - 7$	<input type="text"/>	$14 - 9$				
<input type="text"/>	$12 - 8$	$13 - 9$					
$11 - 8$	$12 - 9$						
$11 - 9$							

Give the answers for subtraction cards. Let's fill in the blank cards. Which place do you fill in first? Explain the ways of the arrangements.



- 1 Let's fill in the expression for subtraction (minuend) – (subtrahend), in the following table.

T - Math Subtraction		Subtrahend									
		1	2	3	4	5	6	7	8	9	10
Minuend	10	10-1	10-2								
	11	11-1									
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										
	20										

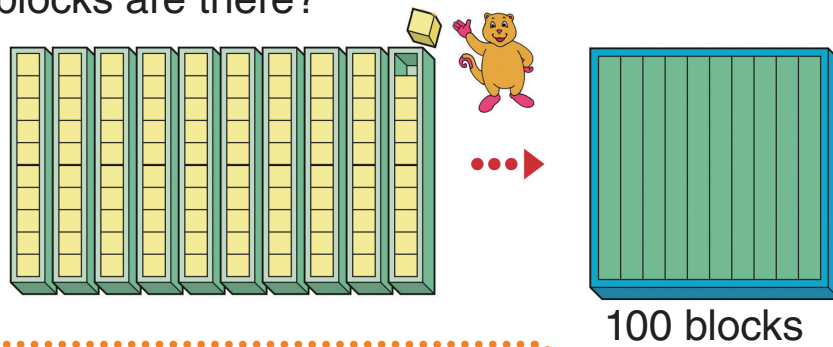
- 2 Let's fill in answers for the subtractions in the following table.

T - Math Subtraction		Subtrahend									
		1	2	3	4	5	6	7	8	9	10
Minuend	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										
	20										

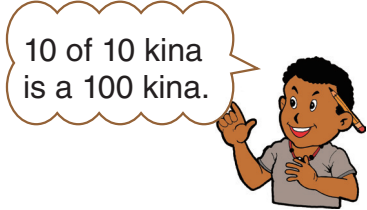
- 3 Let's develop the T-Math for subtraction and ask your friends to fill in each space.

Number up to 1000

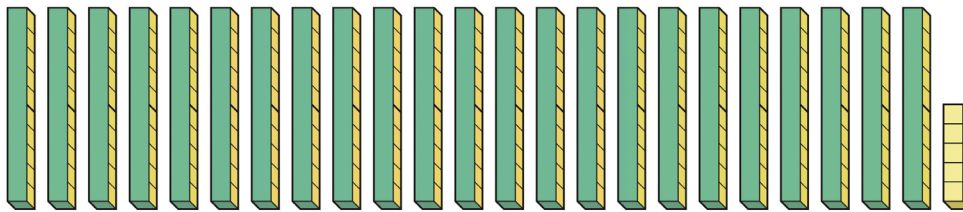
20 How many blocks are there?



10 sets of 10 is a hundred → 100



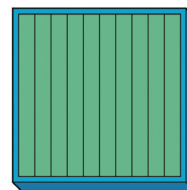
- 1 How many more does 96 need to become 100?
- 2 What number is 10 less than 120?
- 3 Look at the picture below and fill in the .



There are boxes of 10 and ones blocks.

10 sets of 10 boxes make 100.

Then, there are sets of 100.



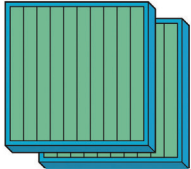
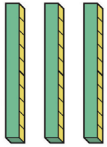
2 sets of 100 is two hundred.
Two hundred, thirty and five is called **two hundred and thirty five** and it is written as **235**.

100s	10s	1s
Hundreds place	Tens place	Ones place
two hundred	thirty	five
2	3	5

21

How many  are there altogether?

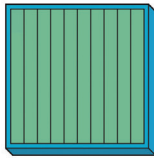

1

100s	10s	1s
Hundreds place	Tens place	Ones place
		

100s	10s	1s
Hundreds	Tens	Ones

The number when two hundred and thirty are added together.

2

100s	10s	1s
Hundreds place	Tens place	Ones place
		


100s	10s	1s
Hundreds	Tens	Ones

The number when one hundred and five are added together.


22

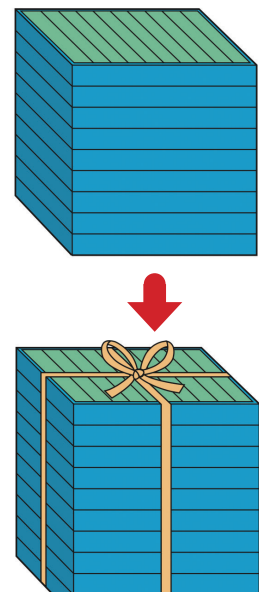
Each box contains 100  each.

1

How many  are there altogether in 9 boxes of 100.

2

When one more box of 100 is added, there will be 10 boxes. How many  are there altogether?



The sum of 10 sets of 100 is called a **thousand** and is written as **1000**.

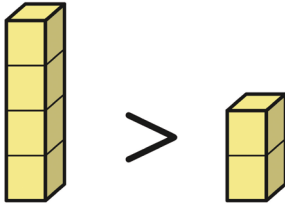
1 0 0 0

How much larger is 1000 than 999?



23 Let's compare the sizes of the numbers.

1



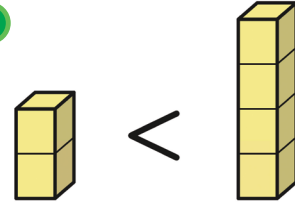
$4 > 2$

2



$3 = 3$

3

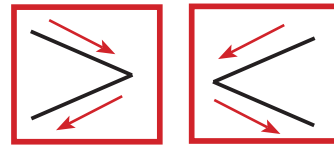


$2 < 4$

4 is than 2. 3 is the size as 3. 2 is than 4.



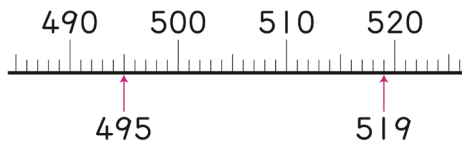
> and < are signs to represent larger than and smaller than for comparing sizes. When the size is the same, = is used.



24

Which number is larger? Please represent it by using either > or <.

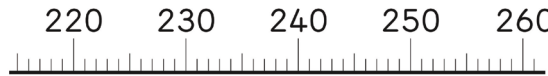
1 495 519



2 769 764



3 238 253



Which place values should we look at?

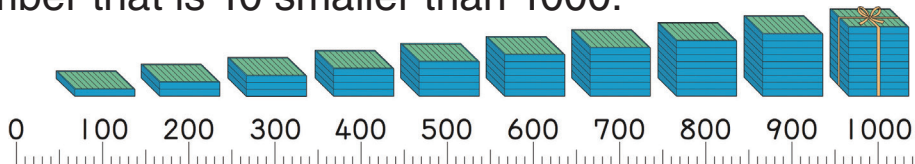
100s	10s	1s
Hundreds	Tens	Ones
4	9	5
5	1	9



25

Let's write down the following numbers.

- 1 The number that is 300 larger than 500.
- 2 The number that is 200 smaller than 700.
- 3 The number that is 10 larger than 900.
- 4 The number that is 10 smaller than 1000.



 **Exercise**

1 Let's read the following numbers.

- ① 826 ② 160 ③ 408 ④ 505 ⑤ 900

2 Let's write the following numbers.

- ① seven hundred and forty ② eight hundred and sixty
③ one hundred and twenty ④ five hundred and eight
⑤ one hundred and one ⑥ six hundred

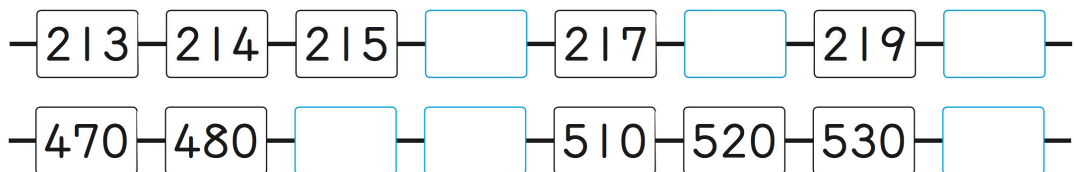
3 Let's fill in each with a number.

- ① 1000 is the sum of sets of 10.
② 1000 is the sum of sets of 100.
③ The number when two hundred, fifty and four added together is .
④ The number when 3 sets of 100, 8 sets of 1 added together is .

4 Which number is larger? Use $>$ or $<$.

- ① 312 321 ② 602 598 ③ 880 808

5 Let's fill in each with a number.



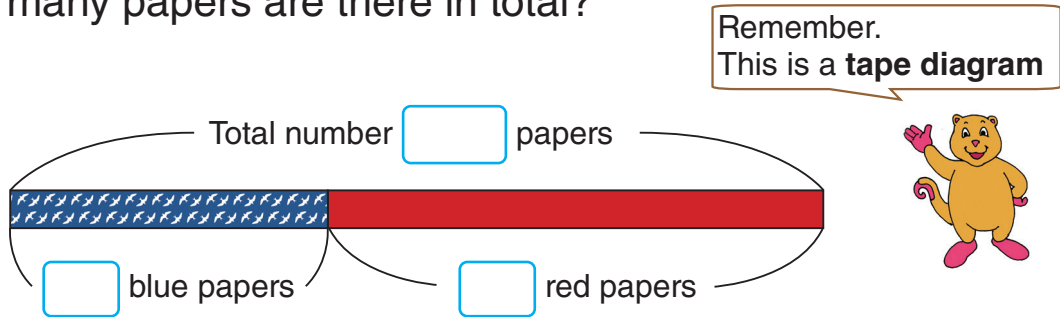
6 Let's look at 480 and fill each with a number.

- ① 4 in the hundreds place means that 4 is the value of .
- ② 480 is the sum of sets of 10.
- ③ The number that is 20 more than 480 is .

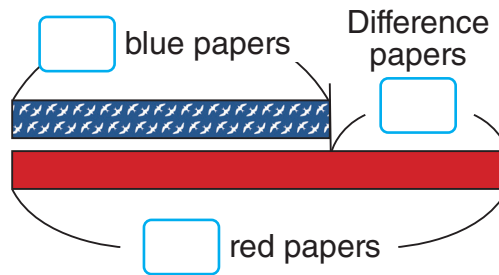
Addition or Subtraction

26 Write a mathematical expression and solve it based on each tape diagram. There are 9 blue papers and 14 red papers.

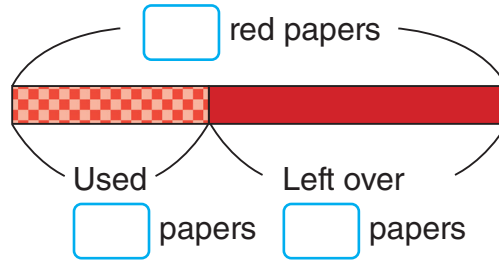
1 How many papers are there in total?



2 Which colour is more and by how many?



3 4 red papers are used. How many red papers are left?



Homework ★

1 Which type of tape diagram can tell the story well? Choose a diagram above **1**, **2** and **3**.

- ① There are 12 red marbles and 14 blue marbles. How many marbles are there in total?
- ② Jane picked 18 beautiful stones. Teacher picked up 4 more than Jane. How many stones did the teacher have?
- ③ Hilda had 21 stickers. She gave some to her friend and she is left with 16 for herself. How many stickers did she give to her friend?

Addition in Vertical Form 1

27 Find the answers '13 + 24' using vertical form.

Adding 10s and 1s.

How to Add 13 + 24 using Vertical Form

$$\begin{array}{r} 13 \\ + 24 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ + 24 \\ \hline 37 \end{array}$$

$$1 + 2 = 3 \quad 3 + 4 = 7$$

Line up numbers according to their place value.

Add numbers in the ones place, then numbers in the tens place.

1 Find the answers using vertical form.

① $31 + 57$

② $18 + 40$

③ $50 + 36$

④ $20 + 70$

28 Find the answers '38 + 27' using vertical form.

How to Add 38 + 27 using Vertical Form

$$\begin{array}{r} 38 \\ + 27 \\ \hline \end{array} \rightarrow \begin{array}{r} 38 \\ + 27 \\ \hline 15 \end{array} \rightarrow \begin{array}{r} 38 \\ + 27 \\ \hline 1 \\ 65 \end{array}$$

Line up numbers according to their place value. Add the ones place first.

$8 + 7 = 15$
The ones place is . Carry 1 ten to the tens place.

1 ten was carried so $3 + 2 + 1 = 6$.
The tens place is .

10 of 1s are 10



1 Find the answers using vertical form.

① $14 + 29$

② $28 + 16$

③ $59 + 36$

④ $72 + 18$

⑤ $56 + 4$

⑥ $8 + 44$

29 Find the mistake and explain the reason.

1

$$\begin{array}{r} 27 \\ + 65 \\ \hline 82 \end{array}$$

2

$$\begin{array}{r} 56 \\ + 3 \\ \hline 8 \end{array}$$



1 Let's add in vertical form. Before addition, please see the numbers if the addition has carrying over or not.

- | | | | | |
|---|---|---|---|---|
| ① $\begin{array}{r} 26 \\ + 43 \\ \hline \end{array}$ | ② $\begin{array}{r} 47 \\ + 27 \\ \hline \end{array}$ | ③ $\begin{array}{r} 7 \\ + 82 \\ \hline \end{array}$ | ④ $\begin{array}{r} 15 \\ + 56 \\ \hline \end{array}$ | ⑤ $\begin{array}{r} 43 \\ + 38 \\ \hline \end{array}$ |
| ⑥ $\begin{array}{r} 91 \\ + 43 \\ \hline \end{array}$ | ⑦ $\begin{array}{r} 77 \\ + 9 \\ \hline \end{array}$ | ⑧ $\begin{array}{r} 82 \\ + 7 \\ \hline \end{array}$ | ⑨ $\begin{array}{r} 15 \\ + 5 \\ \hline \end{array}$ | ⑩ $\begin{array}{r} 35 \\ + 45 \\ \hline \end{array}$ |
| ⑪ $\begin{array}{r} 31 \\ + 60 \\ \hline \end{array}$ | ⑫ $\begin{array}{r} 28 \\ + 63 \\ \hline \end{array}$ | ⑬ $\begin{array}{r} 20 \\ + 17 \\ \hline \end{array}$ | ⑭ $\begin{array}{r} 19 \\ + 18 \\ \hline \end{array}$ | ⑮ $\begin{array}{r} 18 \\ + 19 \\ \hline \end{array}$ |

2 Mary has 27 flowers. James gave 65 flowers to Mary.

How many flowers does Mary have altogether?

3 Let's make an addition story for $56 + 3$.

4 Before adding in vertical form, please predict which answer will be larger? Confirm your prediction if it is appropriate or not by using vertical form.

- ① $18 + 19$, $21 + 9$ ② $39 + 27$, $40 + 30$ ③ $25 + 48$, $30 + 40$

Let's develop T-Math for addition of two-digit numbers as follows.

T-Math Addition		Addends												
		34	35	36	37	38	39	54	55	56	57	58	59	66
Augends	43													
	44													
	45													
	46													

5 Let's work together with friends and fill in each space.

$20 = \square + \square$

Addition in Vertical Form 2

30 Explain the way of calculating this vertical addition using the block diagram.

$$\begin{array}{r} 74 \\ + 65 \\ \hline 139 \end{array}$$



10 of 10s blocks are 100 blocks.

100s	10s	1s
Hundreds place	Tens place	Ones place
+		

--	--	--

31 Add in vertical form.

1 $93 + 86$

2 $63 + 71$

3 $67 + 80$

4 $20 + 90$

32 Explain each vertical form using block diagram.

$$\begin{array}{r} 48 \\ + 87 \\ \hline 135 \end{array}$$

$$\begin{array}{r} 48 \\ + 87 \\ \hline 135 \end{array}$$

100s	10s	1s
Hundreds place	Tens place	Ones place
+		

--	--	--

33 Let's add in vertical form.

1 $35 + 96$

2 $58 + 62$

3 $27 + 78$

4 $15 + 85$

5 $6 + 97$

6 $100 + 400$

7 $100 + 900$

8 $345 + 7$

9 $463 + 29$

10 $616 + 66$

11 $748 + 43$



1 Let's add in vertical form. Before addition, please think how many times carrying over will happen in the process of addition.

① $\begin{array}{r} 88 \\ + 44 \\ \hline \end{array}$	② $\begin{array}{r} 36 \\ + 89 \\ \hline \end{array}$	③ $\begin{array}{r} 32 \\ + 69 \\ \hline \end{array}$	④ $\begin{array}{r} 200 \\ + 600 \\ \hline \end{array}$	⑤ $\begin{array}{r} 600 \\ + 400 \\ \hline \end{array}$
⑥ $\begin{array}{r} 286 \\ + 4 \\ \hline \end{array}$	⑦ $\begin{array}{r} 121 \\ + 9 \\ \hline \end{array}$	⑧ $\begin{array}{r} 36 \\ + 32 \\ \hline \end{array}$	⑨ $\begin{array}{r} 500 \\ + 500 \\ \hline \end{array}$	⑩ $\begin{array}{r} 325 \\ + 35 \\ \hline \end{array}$

2 Let's find easier ways of calculation.

① $56 + 22 + 8$ ② $54 + 32 + 26$

3 Let's add in vertical form and confirm the answer using calculator.

① $\begin{array}{r} 23 \\ 35 \\ + 41 \\ \hline \end{array}$	② $\begin{array}{r} 27 \\ 33 \\ + 20 \\ \hline \end{array}$	③ $\begin{array}{r} 30 \\ 20 \\ 10 \\ + 7 \\ \hline \end{array}$
---	---	--

4 When do you prefer to use calculator for adding and when not?

5 Let's develop T-Math for addition of two-digit numbers as follows.

T-Math Addition		Addends												
		34	35	36	37	38	39	54	55	56	57	58	59	66
Augends	63													
	64													
	65													
	66													

6 Let's work together with friends and fill in each space.

Subtraction in Vertical Form 1

34 Let's find the answers in vertical form.

1 $76 - 32$

2 $56 - 40$

3 $58 - 5$

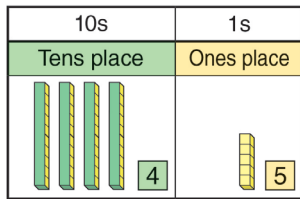
4 $98 - 18$

5 $43 - 42$

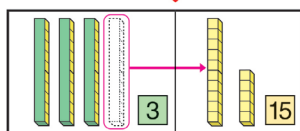
6 $30 - 20$

35 Let's explain subtraction in vertical form using block diagram.

	4	5
-	2	7



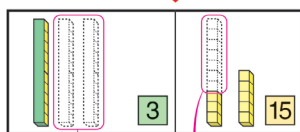
Can we remove 7 blocks from 5 blocks? What shall we do?



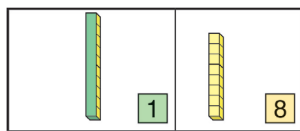
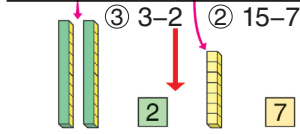
Step 1.
Borrow 1 ten as 10 ones.



① Borrow 1 ten as 10 ones.



Step 2.
7 blocks remove from 15 blocks at 1s place.
Step 3.
Two 10s remove from three 10s at 10s place.



Yes, finally we have an answer 18 as one of tens blocks and 8 of 1s blocks.

How to Subtract 45 - 27 Using Vertical Form

	Ones place	Tens place
$\begin{array}{r} 45 \\ -27 \\ \hline \end{array}$	$\begin{array}{r} 3 \ 10 \\ \cancel{4} 5 \\ -27 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \ 10 \\ \cancel{4} 5 \\ -27 \\ \hline 18 \end{array}$

Line up numbers in each column.

Borrow 1 ten as 10 ones, so $15 - 7 = 8$. The ones place of the answer becomes .

1 ten has been borrowed by the ones place. So $3 - 2 = \square$.

36 Let's find the answers in vertical form.

1 $41 - 19$

2 $70 - 56$

3 $26 - 18$

4 $90 - 88$

5 $92 - 8$

6 $40 - 7$



1 Let's subtract in vertical form. Before subtraction, please check the necessity of borrowing.

① $\begin{array}{r} 59 \\ - 45 \\ \hline \end{array}$	② $\begin{array}{r} 70 \\ - 23 \\ \hline \end{array}$	③ $\begin{array}{r} 53 \\ - 26 \\ \hline \end{array}$	④ $\begin{array}{r} 45 \\ - 5 \\ \hline \end{array}$	⑤ $\begin{array}{r} 72 \\ - 33 \\ \hline \end{array}$
⑥ $\begin{array}{r} 81 \\ - 16 \\ \hline \end{array}$	⑦ $\begin{array}{r} 66 \\ - 28 \\ \hline \end{array}$	⑧ $\begin{array}{r} 40 \\ - 24 \\ \hline \end{array}$	⑨ $\begin{array}{r} 50 \\ - 33 \\ \hline \end{array}$	⑩ $\begin{array}{r} 58 \\ - 32 \\ \hline \end{array}$
⑪ $\begin{array}{r} 51 \\ - 9 \\ \hline \end{array}$	⑫ $\begin{array}{r} 54 \\ - 45 \\ \hline \end{array}$	⑬ $\begin{array}{r} 40 \\ - 24 \\ \hline \end{array}$	⑭ $\begin{array}{r} 39 \\ - 23 \\ \hline \end{array}$	⑮ $\begin{array}{r} 38 \\ - 22 \\ \hline \end{array}$

2 There are 32 children in Michelle's class. 3 of them are absent today. How many are present?

3 Let's make subtraction stories for $42 - 39$. Before subtracting in vertical form, please predict which answer will be larger? Confirm your prediction if it is correct or not by using vertical form.

① $74 - 31$, $40 - 30$ ② $30 - 17$, $33 - 14$ ③ $87 - 59$, $90 - 60$

4 Let's develop T-Math for subtraction of two-digit numbers.

T-Math Subtraction		Subtrahends												
		34	35	36	37	38	39	54	55	56	57	58	59	62
Minuends	63													
	64													
	65													
	66													

5 Let's work together with friends and fill in each space.

$24 = \square + \square$

Subtraction in Vertical Form 2

37 Explain subtraction in vertical form with borrowing.

①

$$\begin{array}{r} 129 \\ - 73 \\ \hline \end{array}$$

↓

$$\begin{array}{r} 129 \\ - 73 \\ \hline 6 \end{array}$$

↓

$$\begin{array}{r} 10 \\ \cancel{1}29 \\ - 73 \\ \hline 56 \end{array}$$

②

$$\begin{array}{r} 125 \\ - 86 \\ \hline \end{array}$$

↓

$$\begin{array}{r} 10 \\ \cancel{1}25 \\ - 86 \\ \hline 9 \end{array}$$

↓

$$\begin{array}{r} 10 \\ \cancel{1}25 \\ - 86 \\ \hline \square 9 \end{array}$$

③

$$\begin{array}{r} 100 \\ - 78 \\ \hline \end{array}$$

↓

$$\begin{array}{r} 9 \\ \cancel{1}00 \\ - 78 \\ \hline \end{array}$$

↓

$$\begin{array}{r} 9 \\ \cancel{1}00 \\ - 78 \\ \hline \square 2 \end{array}$$

38 Find the answers in vertical form.

① $132 - 41$

② $109 - 53$

③ $146 - 60$

④ $132 - 47$

⑤ $120 - 61$

⑥ $106 - 59$

⑦ $105 - 58$

⑧ $100 - 39$

⑨ $102 - 17$

⑩ $102 - 7$

⑪ $900 - 500$

⑫ $1000 - 200$

⑬ $536 - 5$

39 Find the appropriate number in each box.

①

$$\begin{array}{r} \square 8 \\ - 2 \square \\ \hline 64 \end{array}$$

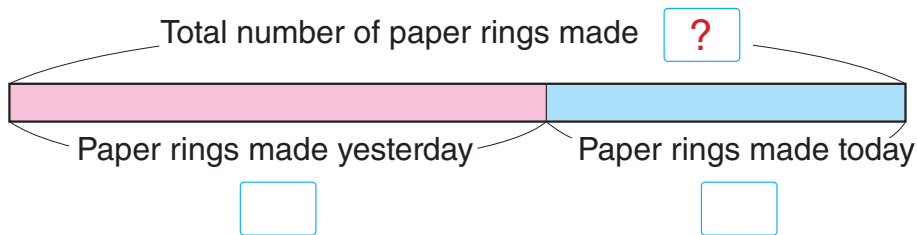
②

$$\begin{array}{r} 8 \square \\ - \square 9 \\ \hline 58 \end{array}$$

1 Addition of 3-digit Numbers

- 1 For the party decoration, we made 215 paper rings yesterday and 143 rings today.

How many paper rings did we make altogether?



- Write a mathematical expression.
- Approximately how many paper rings is the answer?
- Let's think about how to add three-digit numbers.

Let's remember the additions in 2nd grade to think of how to do this.



100s	10s	1s		100s	10s	1s
Hundreds place	Tens place	Ones place		Hundreds place	Tens place	Ones place
			+			



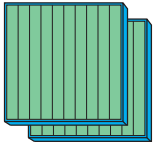


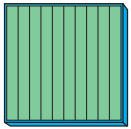
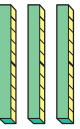

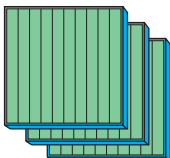
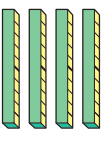

Let's think about how to add.



Naiko's idea

Line up place values, then put in numbers accordingly.



100s	10s	1s
Hundreds place	Tens place	Ones place
 2	 1	 5
 1	 4	 3
 3	 5	 8

2 + 1 for the sets of 100s.

1 + 4 for the sets of 10s.

5 + 3 for the ones.



Yamo's idea

Calculate the addition vertically like the addition of 2-digit numbers.

	2	1	5
+	1	4	3
	3	5	8

Addition Algorithm for 215 + 143 in Vertical Form

$$\begin{array}{r} 215 \\ + 143 \\ \hline \end{array}$$

$$\begin{array}{r} 215 \\ + 143 \\ \hline 358 \end{array}$$

Vertically line up the numbers according to their place values.

2 + 1 = 3

1 + 4 = 5

5 + 3 = 8



For adding large numbers vertically, we line up the numbers according to their place values.

Exercise

- ① 153 + 425 ② 261 + 637 ③ 437 + 302 ④ 502 + 205

2 Let's think about how to add $238 + 546$ in vertical form.



How is it different to $215 + 143$?

	2	3	8
+	5	4	6
<hr/>			

3 Let's think about the students' vertical additions below.

- 1 Whose problems do you have to carry over once?
- 2 Whose problems do you have to carry over twice?

Ratu

$$\begin{array}{r} 248 \\ + 187 \\ \hline \end{array}$$

Shama

$$\begin{array}{r} 537 \\ + 167 \\ \hline \end{array}$$

Jonat

$$\begin{array}{r} 174 \\ + 265 \\ \hline \end{array}$$

Lucy

$$\begin{array}{r} 865 \\ + 746 \\ \hline \end{array}$$

Joy

$$\begin{array}{r} 238 \\ + 546 \\ \hline \end{array}$$

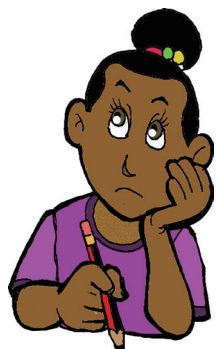
Let's think about how to calculate.



4 Let's write numbers in to make addition problems for 3-digit numbers.

+			
<hr style="width: 100%;"/>			

5 Let's think about how to add $174 + 265$ in vertical form.



On which place values do we carry?

	1	7	4
+	2	6	5

6 Let's explain how to add $248 + 187$ in vertical form.

100s Hundreds place	10s Tens place	1s Ones place
2	4	8
+	1	8
4	3	5

Do not forget to write down the number you carry. You should write a small 1.

	2	4	8
+	1	8	7
			5



		1	
	2	4	8
+	1	8	7
		3	5



	1	1	
	2	4	8
+	1	8	7
	4	3	5



Step 3 100s Carry 1 to the Hundreds place. $2 + 1 + 1$	Step 2 10s Carry 1 to the tens place. $4 + 8 + 1$	Step 1 1s $8 + 7$
--	---	--------------------------------



When adding large numbers in a vertical form, the best way is to start adding from the ones place value to the most superior which means higher place value.

	5	3	7
+	1	6	7

7 Let's think about how to add $537 + 167$ in vertical form. Also, try calculating after switching the addend and augends, and check whether the answer is correct.

Remember

$537 + 167$

↑ ↑
Augend Addend



For addition, we calculate in vertical form as follows.

- Calculate the numbers in the same place value.
- When the sum is 10 and greater you carry up the number in the place to the next superior place and calculate.

Using this method, we can add any large numbers!



8 Let's make the addition problems of 3-digit numbers which have answer of 653 with the following condition;

$$\begin{array}{r} \square \square \square \\ + \square \square \square \\ \hline 6 \ 5 \ 3 \end{array}$$

- Carry over once
- Carry over twice

8 ① When the ones place carries up

First, to calculate the ones place; find 2 numbers which add up to 13.

4 and 9, 5 and 8, 6 and 7

Next, to calculate the tens place, due to the round up from the ones place, find two numbers which add up to 4.

0 and 4, 1 and 3, 2 and 2

Then, to calculate the hundreds place, find two numbers which add to up 6.

1 and 5, 2 and 4, 3 and 3

If you use words like 'first', 'next', and 'then', it is smart.



Let's continue your answer in your exercise book.

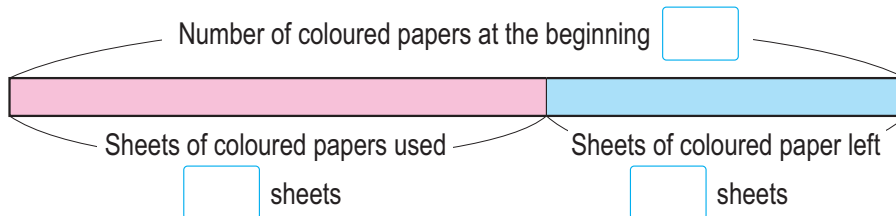


Exercise

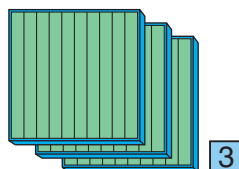
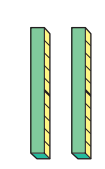
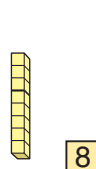
- $145 + 438$
- $305 + 607$
- $293 + 186$
- $360 + 280$
- $422 + 91$
- $335 + 196$
- $427 + 378$
- $215 + 485$

2 Subtraction of 3-digit Numbers

- 1 There were 328 sheets of coloured papers. For the party decoration, 215 sheets of coloured papers were used. How many sheets of coloured papers are left?



- 1 Write a mathematical expression.
- 2 Approximately how many sheets of coloured papers is the answer?
- 3 Let's think about how to calculate.

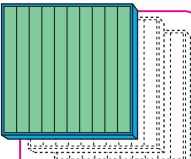


100s	10s	1s
Hundreds place	Tens place	Ones place
 3	 2	 8

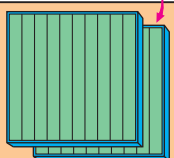
Are there more than 100 sheets of papers left?



Kekeni's idea $328 - 215$

I used paper blocks and removed the numbers on same place values.

100s	10s	1s
Hundreds place	Tens place	Ones place
		



Removing 2 sets of 100s.

1



Removing 1 set of 10s.

1



Removing 5 from 8.

3

$$328 - 215 = 113$$



Gawi's idea

I subtracted using vertical form as we did subtraction of 2-digit numbers.

$$\begin{array}{r} 328 \\ - 215 \\ \hline 113 \end{array}$$

Which ideas do you like? Compare and discuss.



I think their ideas are similar because...



Subtraction Algorithm for $328 - 215$ in Vertical Form

$$\begin{array}{r} 328 \\ - 215 \\ \hline \end{array}$$

$$\begin{array}{r} 328 \\ - 215 \\ \hline 113 \end{array}$$

Vertically line up the numbers according to their place values.

$3 - 2 = 1$

$2 - 1 = 1$

$8 - 5 = 3$



For subtracting large numbers in vertical form, we line up the numbers according to their place values.

Exercise

- ① $768 - 534$ ② $879 - 412$ ③ $647 - 317$ ④ $965 - 864$

2 Let's think about how to subtract in vertical form.

① $692 - 458$

$$\begin{array}{r} 692 \\ - 458 \\ \hline \end{array}$$

② $329 - 173$

$$\begin{array}{r} 329 \\ - 173 \\ \hline \end{array}$$

On which place values are numbers borrowed?



3 Let's think about the students' vertical subtractions below.

- ① Whose problem do you have to borrow once?
- ② Whose problem do you have to borrow twice?
- ③ Whose problem do you have to borrow from the hundreds?

Steve

$$\begin{array}{r} 329 \\ - 173 \\ \hline \end{array}$$

Lolo

$$\begin{array}{r} 692 \\ - 458 \\ \hline \end{array}$$

Kim

$$\begin{array}{r} 500 \\ - 163 \\ \hline \end{array}$$

Semu

$$\begin{array}{r} 305 \\ - 178 \\ \hline \end{array}$$

Pati

$$\begin{array}{r} 425 \\ - 286 \\ \hline \end{array}$$

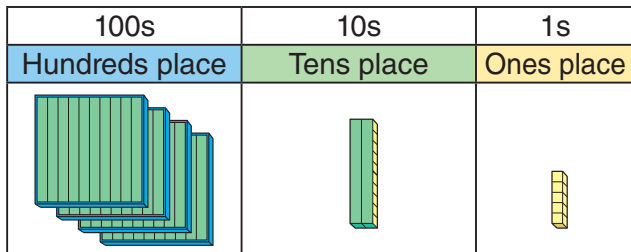
Let's think about how to calculate.



4 Let's write numbers in the to make subtraction problems for 3-digit numbers.

-			

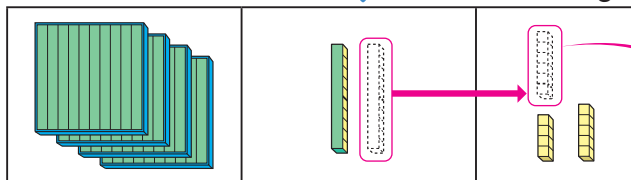
5 Let's think about how to subtract $425 - 286$ in vertical form.



How can I remove 6 since we have 5 only.

$$\begin{array}{r} 425 \\ - 286 \\ \hline \end{array}$$

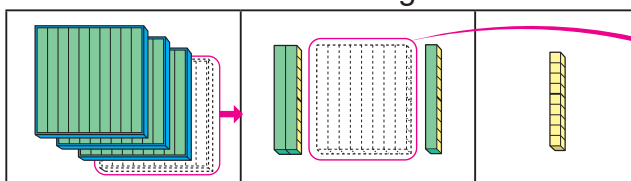
1. Removing 6



① Borrow 1 ten from the tens place. ② $15 - 6$

$$\begin{array}{r} 1 \quad 10 \\ 425 \\ - 286 \\ \hline \end{array}$$

2. Removing 80

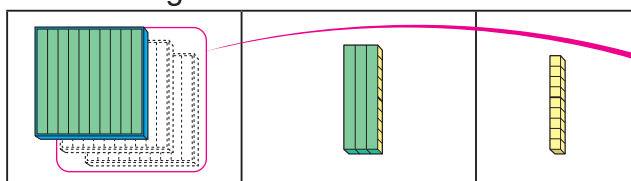


③ Borrow 1 hundreds from the hundreds place. ④ $11 - 8$

I want to remove 8 sets of 10s. I need more 10s.

$$\begin{array}{r} 10 \quad 10 \\ 3 \quad 1 \quad 10 \\ 425 \\ - 286 \\ \hline \end{array}$$

3. Removing 200



⑤ $3 - 2$

8 tens (80)

$$\begin{array}{r} 10 \quad 10 \\ 3 \quad 1 \quad 10 \\ 425 \\ - 286 \\ \hline \end{array}$$

2 hundreds (200)

$$\begin{array}{r} 10 \quad 10 \\ 3 \quad 1 \quad 10 \\ 425 \\ - 286 \\ \hline \end{array}$$



When we subtract large numbers in vertical form, the best way is to start subtracting from the ones place value to the superior.

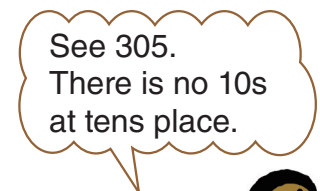
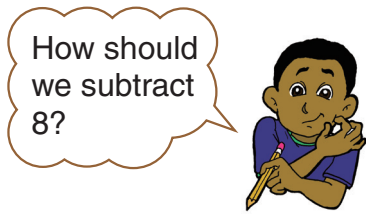
Exercise

- ① $363 - 114$
- ② $540 - 513$
- ③ $825 - 451$
- ④ $526 - 483$
- ⑤ $424 - 185$
- ⑥ $821 - 373$
- ⑦ $510 - 176$
- ⑧ $242 - 64$

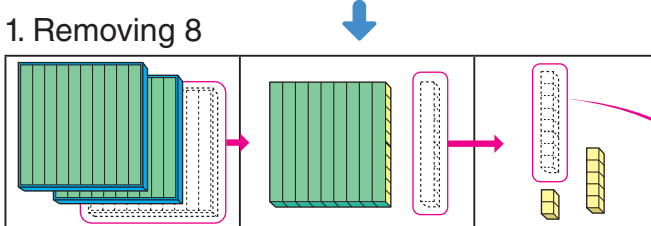
6 Let's explain how to subtract

$305 - 178$ in vertical form.

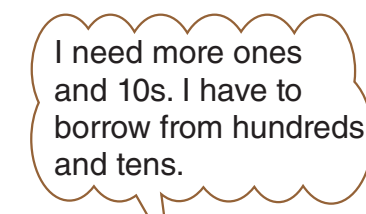
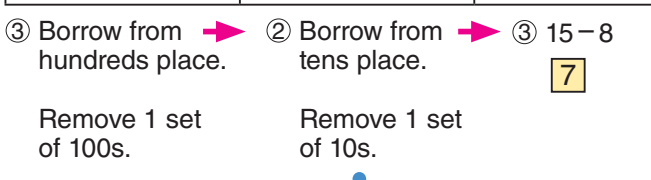
100s	10s	1s
Hundreds place	Tens place	Ones place



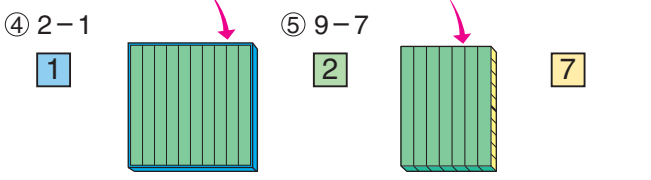
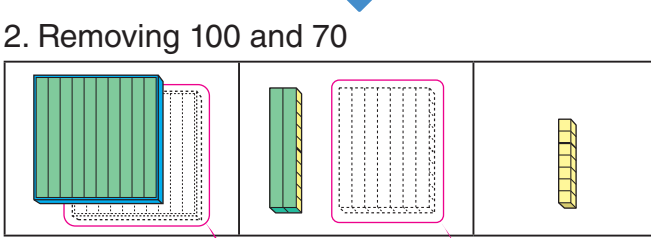
3	0	5	
-	1	7	8



		9	
	2	10 10	
	3	0	5
-	1	7	8
			7



		9	
	2	10 10	
	3	0	5
-	1	7	8
			7



7 Let's explain how to subtract $500 - 163$ in vertical form.



For subtraction, we calculate using vertical form as follows.

- ① Calculate the numbers on the same place value.
- ② When you cannot subtract, borrow from the superior places and calculate.

If you use these methods, you can subtract any larger number!



8 Let's make the subtraction of 3-digit numbers with the answers as 356 using the following conditions.

$$\begin{array}{r} \square \square \square \\ - \square \square \square \\ \hline 3 \ 5 \ 6 \end{array}$$

- ① Borrowing once ② Borrowing twice

8 ① When we cannot subtract from ones place.

First, to calculate the ones place borrow from the tens place, so there will be 2 numbers on ones place which becomes 6 after subtraction.

5 and 9, 4 and 8, 3 and 7, 2 and 6, or 1 and 5.

Next, to calculate the tens place, remember

the number 1 which was borrowed for the ones place. It means finding 2 numbers on the tens place which become 6 after subtraction.

Just think in order, just like addition!

6 and 0, 7 and 1, 8 and 2, or 9 and 3.

Then, to calculate the hundreds place, find 2 numbers which become 3 after subtraction.



Let's continue your answer in your exercise book.



Exercise

- ① 405 - 286 ② 601 - 198 ③ 402 - 107 ④ 702 - 46
 ⑤ 800 - 197 ⑥ 200 - 38 ⑦ 700 - 403 ⑧ 600 - 9

3

Calculating Larger Numbers

1 Let's explain how to calculate using the carrying over and borrowing.

1 $865 + 746$

8	6	5	
+	7	4	6

2 $1248 - 936$

1	2	4	8
-	9	3	6

3 $1000 - 895$

1	0	0	0
-	8	9	5

2 Let's think about how to calculate larger numbers using what you already learned.

1 $4175 + 3658$

4	1	7	5	
+	3	6	5	8

2 $6073 + 3927$

6	0	7	3	
+	3	9	2	7

Even in larger numbers, we use the same method.

3 $3925 - 1947$

3	9	2	5	
-	1	9	4	7

4 $10000 - 5089$

1	0	0	0	0
-	5	0	8	9



Exercise

1 $525 + 913$

2 $258 + 745$

3 $483 + 517$

4 $1237 - 414$

5 $1358 - 567$

6 $1002 - 946$

7 $4563 + 3125$

8 $2606 + 3198$

9 $3587 + 6413$

10 $6497 - 2135$

11 $8114 - 3518$

12 $10000 - 6001$

4

Considering How to Calculate More Easily

1 Let's calculate easily.

1 $298 + 120$

2 $500 - 198$

1 ① $298 + 120$	1 ② $500 - 198$
When you add 2 to the augend and make 300, calculating becomes easier.	When you add 2 to the subtrahend it becomes 200, calculating becomes easier.
You added 2 to the augend, so you subtract 2 from the addend.	You added 2 to the subtrahend, so you must also add 2 to the minuend.
$298 + 120$	$500 - 198$
add 2 ↓ ↓ subtract 2	add 2 ↓ ↓ add 2
$300 + 118 = 418$	$502 - 200 = 302$
<u>Answer 418</u>	<u>Answer 302</u>



In addition, the answer does not change by adding a number to the augend and subtracting that same number from the addend.

In subtraction, the answer does not change by adding the same number to both the subtrahend and the minuend.

2 Using the idea in 1, calculate the following problems easily.

1 $308 + 197$

2 $305 - 99$

Exercise

① $499 + 350$

② $199 + 299$

③ $600 - 297$

④ $200 - 95$

3 Let's think about how to calculate $875 + 47 + 53$.

If you use these methods, you can add any large number!



When you are adding 3 numbers, the order of calculations does not change the answer.

$$(875 + 47) + 53 = 875 + (47 + 53)$$

The () is a symbol that means you should calculate the numbers inside first.

Mental Calculations

4 Let's calculate mentally.

1 $35 + 46$



Vavi's idea

Calculate in vertical form,

- $5 + 6 = 11$
- $3 + 4 + 1 = 8$ then 81.

Ambai's idea

- Split 46 to 40 and 6.
- $35 + 40 = 75$
- $75 + 6 = 81$



2 $81 - 27$



Sare's idea

Calculate in vertical form,

- $11 - 7 = 4$
- $7 - 2 = 5$ then 54.

Mero idea

- Split 27 to 20 and 7.
- $81 - 20 = 61$
- $61 - 7 = 54$



Exercise

1 Let's calculate easily.

① $492 + 84 + 16$

② $52 + 365 + 48$

2 Let's calculate mentally.

① $18 + 6$

② $38 + 411$

③ $68 + 291$

④ $52 + 18$

⑤ $23 - 8$

⑥ $45 - 24$

⑦ $71 - 46$

⑧ $90 - 76$

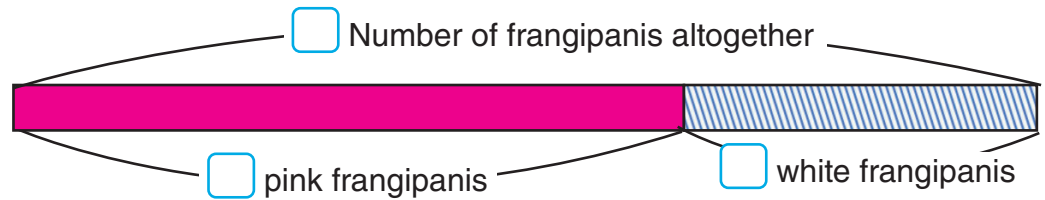
5

What Kind of Calculation is This?

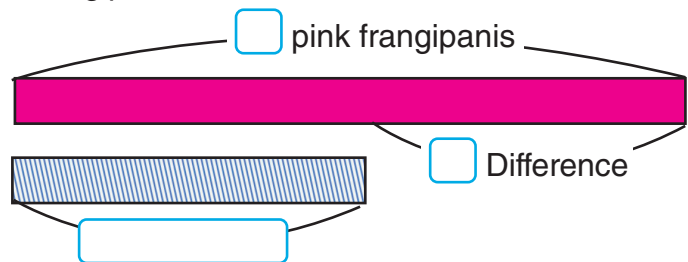
1 There are 245 pink frangipanis and 138 white frangipanis that blossomed.



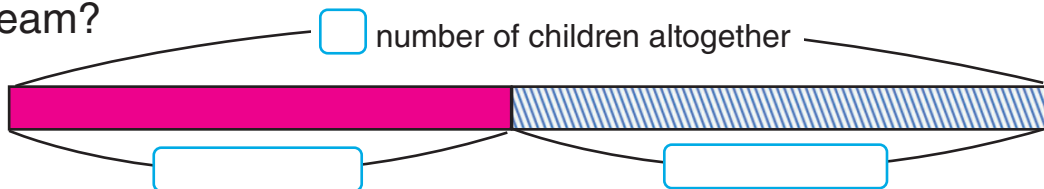
1 How many frangipanis blossomed ?



2 Which colour blossomed the most?



2 There are 605 children in Eileen's school. In a sports day, children are divided into red and blue teams. There are 298 children in the red team. How many children are in the blue team?



3 The 3A students gathered 118 dry coconuts. The 3B students gathered 20 more dry coconuts than 3A students. How many dry coconuts did the 3B students gather?

Let's think about how to represent it in a diagram.





E

x

e

r

c

i

s

e



1 Let's calculate in vertical form.

Pages 27 ~ 35



① $324 + 253$

② $146 + 537$

③ $473 + 261$

④ $246 + 485$

⑤ $354 + 249$

⑥ $464 + 368$

⑦ $658 - 325$

⑧ $374 - 138$

⑨ $546 - 369$

⑩ $432 - 136$

⑪ $604 - 247$

⑫ $700 - 463$

2 Let's calculate in vertical form.

Page 36



① $734 + 862$

② $947 + 587$

③ $457 + 546$

④ $4137 + 1425$

⑤ $2056 + 3794$

⑥ $2361 + 7639$

⑦ $1529 - 716$

⑧ $1153 - 645$

⑨ $1000 - 437$

⑩ $3947 - 1925$

⑪ $3142 - 1734$

⑫ $10000 - 4005$

3 Let's calculate.

Page 38



① $5387 + 57 + 43$

② $26 + 3285 + 74$

4 You read 165 pages of a book with 240 pages in total. How many pages are left?



5 There are 2368 boys and 2356 girls in Elementary schools in Manus Province.

How many elementary school children are there in total? Also, which gender is more and by how many?

Page 39



Page 39



Let's calculate.

Grade 2

Do you remember?



① 3×6

② 8×4

③ 6×9

④ 4×7

⑤ 9×1

⑥ 1×8

⑦ 5×3

⑧ 2×2



1 Let's calculate in vertical form.

● Understanding how to calculate in vertical form.

① $451 + 137$

② $274 + 508$

③ $662 + 150$

④ $186 + 357$

⑤ $109 + 698$

⑥ $558 + 745$

⑦ $3096 + 5518$

⑧ $2048 + 1952$

⑨ $6272 + 3728$

⑩ $797 - 246$

⑪ $258 - 139$

⑫ $966 - 288$

⑬ $653 - 399$

⑭ $703 - 316$

⑮ $1032 - 634$

⑯ $2356 - 1848$

⑰ $5126 - 2835$

⑱ $10000 - 1781$

2 In 2 years Cathy saved 3596 kina and her sister saved 4487 kina.

● Distinguish the situation for addition or subtraction and find the answer.



① Who has more savings and by how much?

② What is the total of their savings?

3 Let's find mistakes in the calculations done in vertical form and find the correct answers.

● Identifying the mistakes in calculations in vertical form and correcting.

$$\begin{array}{r} 294 \\ + 119 \\ \hline 403 \end{array}$$

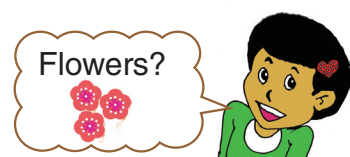
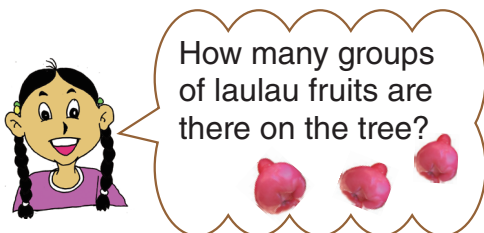
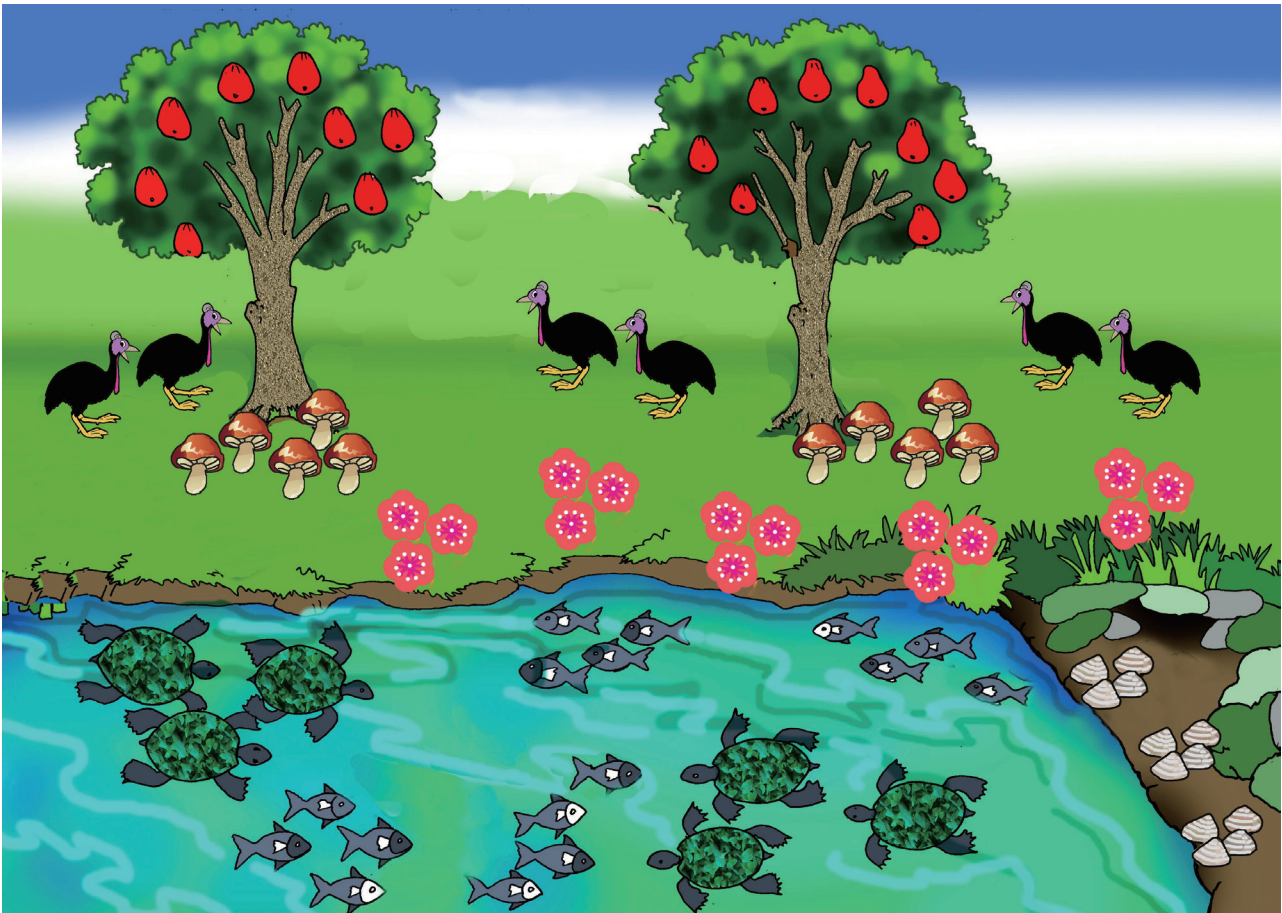
$$\begin{array}{r} 437 \\ - 198 \\ \hline 361 \end{array}$$

Multiplication 1

1 What We Learned in Elementary School

Meaning of Multiplication

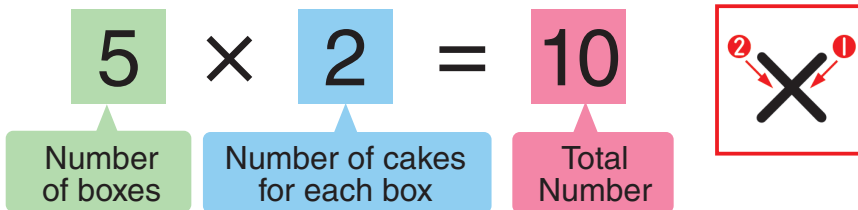
1 Let's represent the situation by making a multiplication sentence.





5 boxes of 2 cakes each make 10 cakes.
This is written as $5 \times 2 = 10$ and read as “5 multiplied by 2 equals 10”

I like cakes very much!
How many cakes are there altogether?

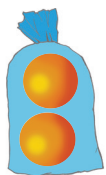


This kind of calculation is called **multiplication**.

It's the same as $2 + 2 + 2 + 2 + 2$.



2 There are 2 oranges in each bag. How many oranges altogether in 1 bag, 2 bags and 3 bags?

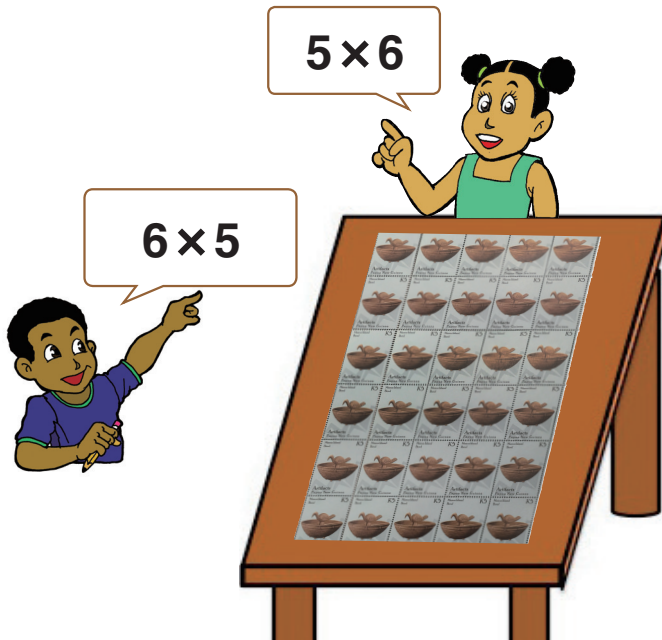
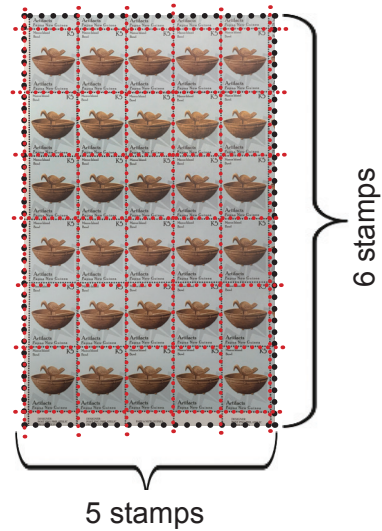


1 bag	$1 \times 2 = 2$	<u>2</u> oranges
2 bags	<input type="text"/> $\times 2 =$ <input type="text"/>	<input type="text"/> oranges
3 bags	<input type="text"/> $\times 2 =$ <input type="text"/>	<input type="text"/> oranges

3 Group the stars (★) to get 4×3 .



4 Naiko and Yamo found a sheet which has 30 stamps. They expressed the number of stamps in different ways by multiplication. In this situation, which expression do you have in mind?



Naiko's idea

The expression is 6×5

6 groups of 5

5 stamps

$5 + 5 + 5 + 5 + 5 + 5 = 30$

Yamo's idea

The expression is 5×6

5 groups of 6

6 stamps

$6 + 6 + 6 + 6 + 6 = 30$

The number given by "6 times of 5" is the same as the number given by "5 times of 6". In other words, 6 groups of 5 and 5 groups of 6 give the same answer. In multiplication, "Multiplying 6 by 5" and "Multiplying 5 by 6" gives the same answer. In short, 6×5 is equal to 5×6 .

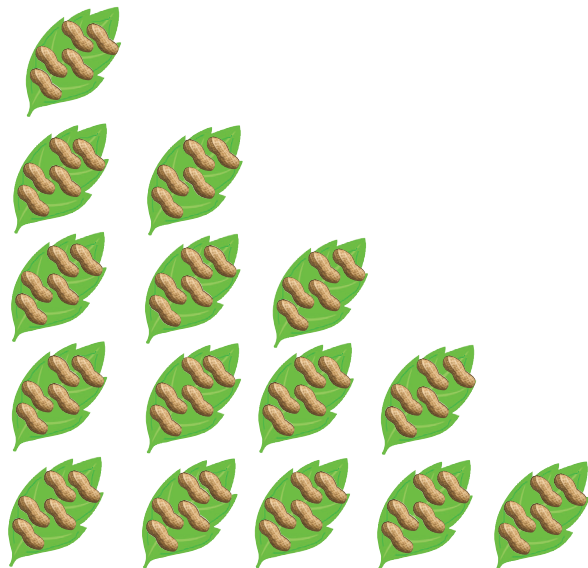
The Multiplication of 5

5 Let's make a mathematical expression of multiplication for the number of lollies.



6 Let's draw a picture of 3×5 .

7 There are 5 peanuts on each leaf. Let's find the total number of peanuts as the number of leaves increases from 1 to 5 and read the sentence.



$1 \times 5 = 5$
1 multiplied by 5 equals 5

$2 \times 5 = \square$
2 multiplied by 5 equals 10

$\square \times \square = \square$

$\square \times \square = \square$

$\square \times \square = \square$

1 Complete the mathematical sentences from 6 leaves to 9 leaves.

2 Explain what you found.

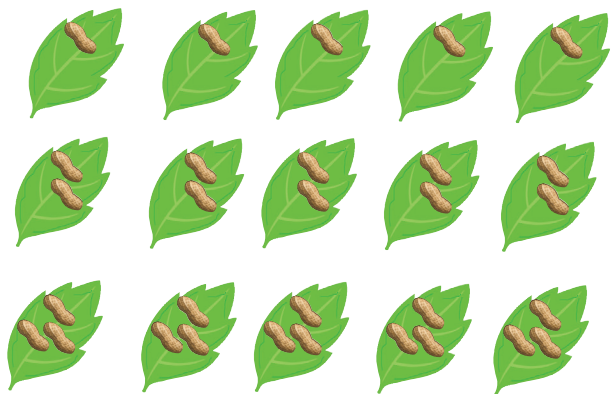
How many peanuts increase as 1 leaf is added?



8

Let's consider the following pictures.

There are 5 leaves of 1 peanut each.



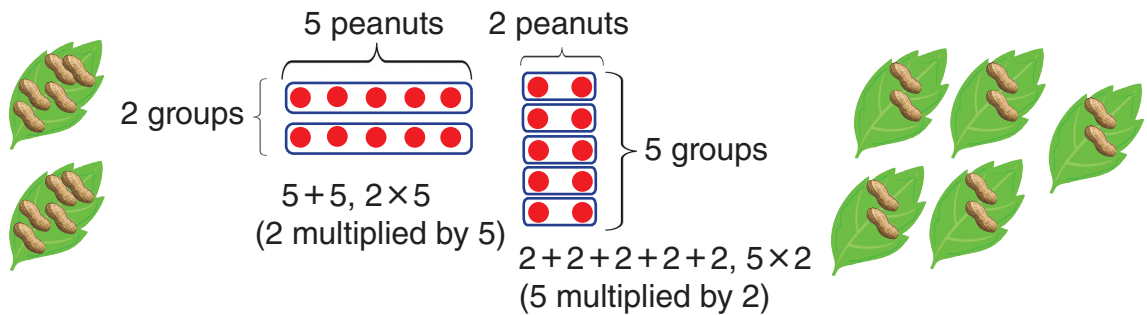
5 × 1 = 5

□ × □ = □

□ × □ = □

1 Complete the mathematical sentences from 4 peanuts to 9 peanuts.

2 Think about the difference compared to 3.



In task 7, second number is always 5. However, in task 8, first number is always 5.

We learned even we switch 1st and 2nd numbers, answer does not change.



Grade 2 Do you remember?



Multiplication tabel of 5

5 × 1 = 5	Five ones are 5	5 × 6 = 30	Five sixes are 30
5 × 2 = 10	Five twos are 10	5 × 7 = 35	Five sevens are 35
5 × 3 = 15	Five threes are 15	5 × 8 = 40	Five eights are 40
5 × 4 = 20	Five fours are 20	5 × 9 = 45	Five nines are 45
5 × 5 = 25	Five fives are 25		

The Multiplication Table 1 to 9

9 Let's explain the pattern and memorise it !



Multiplication table is necessary for our life. Say the multiplication table again and again until you can recall correctly without looking!

The Multiplication Table of 1

$1 \times 1 = 1$... One one is	1
$1 \times 2 = 2$... One two is	2
$1 \times 3 = 3$... One three is	3
$1 \times 4 = 4$... One four is	4
$1 \times 5 = 5$... One five is	5
$1 \times 6 = 6$... One six is	6
$1 \times 7 = 7$... One seven is	7
$1 \times 8 = 8$... One eight is	8
$1 \times 9 = 9$... One nine is	9

The Multiplication Table of 2

$2 \times 1 = 2$... Two ones are	2
$2 \times 2 = 4$... Two twos are	4
$2 \times 3 = 6$... Two threes are	6
$2 \times 4 = 8$... Two fours are	8
$2 \times 5 = 10$... Two fives are	10
$2 \times 6 = 12$... Two sixes are	12
$2 \times 7 = 14$... Two sevens are	14
$2 \times 8 = 16$... Two eights are	16
$2 \times 9 = 18$... Two nines are	18

The Multiplication Table of 3

$3 \times 1 = 3$... Three ones are	3
$3 \times 2 = 6$... Three twos are	6
$3 \times 3 = 9$... Three threes are	9
$3 \times 4 = 12$... Three fours are	12
$3 \times 5 = 15$... Three fives are	15
$3 \times 6 = 18$... Three sixes are	18
$3 \times 7 = 21$... Three sevens are	21
$3 \times 8 = 24$... Three eights are	24
$3 \times 9 = 27$... Three nines are	27

The Multiplication Table of 4

$4 \times 1 = 4$... Four ones are	4
$4 \times 2 = 8$... Four twos are	8
$4 \times 3 = 12$... Four threes are	12
$4 \times 4 = 16$... Four fours are	16
$4 \times 5 = 20$... Four fives are	20
$4 \times 6 = 24$... Four sixes are	24
$4 \times 7 = 28$... Four sevens are	28
$4 \times 8 = 32$... Four eights are	32
$4 \times 9 = 36$... Four nines are	36

10 Let's discuss about the patterns you have found!



Mero's idea

If each number at the back increases by 1 in the table of 2, the answer increases by .



Vavi's idea

In the table of 3, the answers increase by as the numbers at the back increases by .

The Multiplication Table of 5

$5 \times 1 = 5$... Five ones are	5
$5 \times 2 = 10$... Five twos are	10
$5 \times 3 = 15$... Five threes are	15
$5 \times 4 = 20$... Five fours are	20
$5 \times 5 = 25$... Five fives are	25
$5 \times 6 = 30$... Five sixes are	30
$5 \times 7 = 35$... Five sevens are	35
$5 \times 8 = 40$... Five eights are	40
$5 \times 9 = 45$... Five nines are	45

The Multiplication Table of 6

$6 \times 1 = 6$... Six ones are	6
$6 \times 2 = 12$... Six twos are	12
$6 \times 3 = 18$... Six threes are	18
$6 \times 4 = 24$... Six fours are	24
$6 \times 5 = 30$... Six fives are	30
$6 \times 6 = 36$... Six sixes are	36
$6 \times 7 = 42$... Six sevens are	42
$6 \times 8 = 48$... Six eights are	48
$6 \times 9 = 54$... Six nines are	54

The Multiplication Table of 7

$7 \times 1 = 7$... Seven ones are	7
$7 \times 2 = 14$... Seven twos are	14
$7 \times 3 = 21$... Seven threes are	21
$7 \times 4 = 28$... Seven fours are	28
$7 \times 5 = 35$... Seven fives are	35
$7 \times 6 = 42$... Seven sixes are	42
$7 \times 7 = 49$... Seven sevens are	49
$7 \times 8 = 56$... Seven eights are	56
$7 \times 9 = 63$... Seven nines are	63

The Multiplication Table of 8

$8 \times 1 = 8$... Eight ones are	8
$8 \times 2 = 16$... Eight twos are	16
$8 \times 3 = 24$... Eight threes are	24
$8 \times 4 = 32$... Eight fours are	32
$8 \times 5 = 40$... Eight fives are	40
$8 \times 6 = 48$... Eight sixes are	48
$8 \times 7 = 56$... Eight sevens are	56
$8 \times 8 = 64$... Eight eights are	64
$8 \times 9 = 72$... Eight nines are	72

The Multiplication Table of 9

$9 \times 1 = 9$... Nine ones are	9
$9 \times 2 = 18$... Nine twos are	18
$9 \times 3 = 27$... Nine threes are	27
$9 \times 4 = 36$... Nine fours are	36
$9 \times 5 = 45$... Nine fives are	45
$9 \times 6 = 54$... Nine sixes are	54
$9 \times 7 = 63$... Nine sevens are	63
$9 \times 8 = 72$... Nine eights are	72
$9 \times 9 = 81$... Nine nines are	81



The increase in the answer is the same as.....

Let's think if the patterns apply to all the other tables !



Say the multiplication tables at home to memorise!

Multiplication 2

1 Rules of Multiplication

- 1 Let's think about the multiplication table.
 - 1 What are the multiplications to get 14 in the table ?
 - 2 Write all the answers in the blanks.
 - 3 Look for the answers 27 and 48 in the multiplication table.

		Multiplicand								
		1	2	3	4	5	6	7	8	9
Multiplier	1									
	2							14		
	3									
	4									
	5									
	6									
	7		14							
	8									
	9									

- 4 Let's find any patterns in the table and share with your friends.



The number we multiply is called the **multiplier**.

The number to be multiplied is called the **multiplicand**.

$$2 \times 4 = 8$$

↑ ← Answer
 Multiplier Multiplicand

2

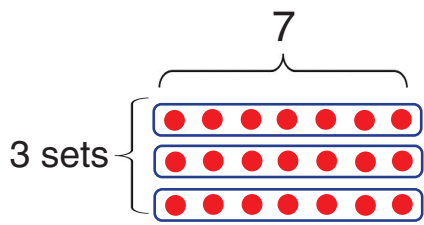
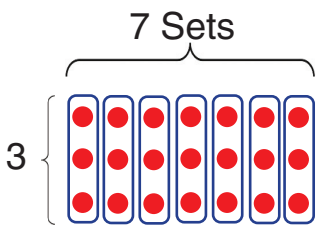
Let's find various rules from the expression that has the same answer for 7×3 .

1 What number goes in the below.

$7 \times 3 = \square$

$3 \times \square = \square$

Let's remember what you studied on multiplication in 2nd grade.



Confirm your answer with the multiplication table.



When you express this in a mathematical sentence, it can be written as follows; $7 \times 3 = 3 \times \square$



"=" is called equal sign. This symbol is not only used for writing the answer of the calculation, but also used for showing that the expressions or numbers on the left side and the right side are equal.



In multiplication, the answer is the same even if the order of the multiplicand and multiplier are changed.

2 How much larger is the answers for 7×6 than answer for 7×5 ?

		Multiplicand								
		1	2	3	4	5	6	7	8	9
7	7	14	21	28	35		49	56	63	

Increase by Decrease by

When you express this in a mathematical sentence, it can be written as follows; $7 \times 6 = 7 \times 5 + \square$

$50 = \square + \square$

- 3 How much smaller is it from the answer of 7×6 to the answer of 7×7 ?

Also, express this in a mathematical sentence.

$$7 \times 6 = 7 \times 7 - \square$$



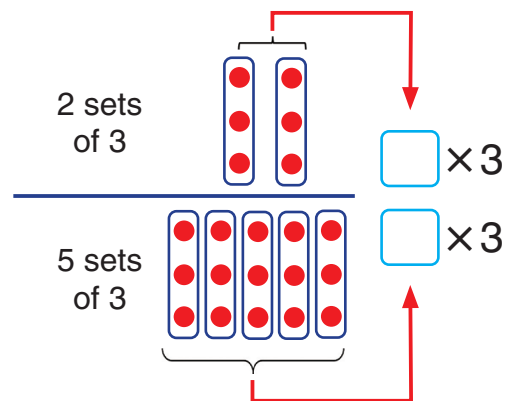
In multiplication, if the multiplicand increases by 1, the answer increases by the number of the multiplier. Also, if the multiplicand is reduced by 1, the answer is reduced by the number of the multiplier.

- 4 Let's think about what will happen to the answer if you split the 1st or 2nd number of 7×3 .

- ① Splitting the multiplier.

$$7 \times 3 \begin{cases} 2 \times 3 = \square \\ \square \times 3 = \square \end{cases}$$

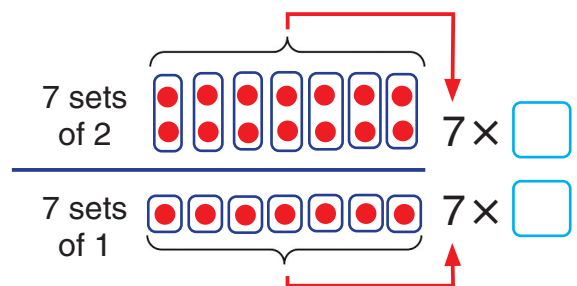
In total \square



- ② Splitting the multiplicand.

$$7 \times 3 \begin{cases} 7 \times 2 = \square \\ 7 \times \square = \square \end{cases}$$

In total \square



Even, if we calculate a multiplication by splitting the multiplier or multiplicand, the answers are the same.

3 Samuel has difficulties in calculating the answer for 6×8 .

Let's give him good hints.



What about calculating 8×6 ?

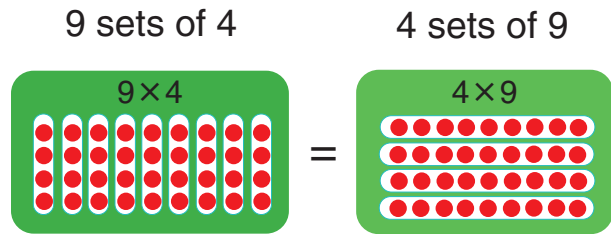
You can get the answer by starting from 1×8 and go in order.



4 Represent the following by using mathematical sentences and diagrams.

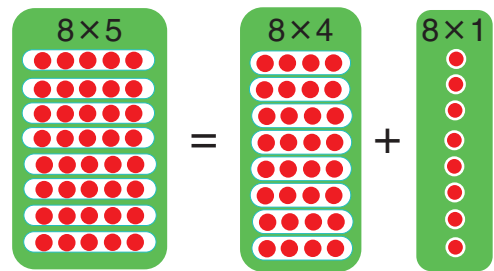
1 If you exchange the order of the 1st and 2nd number in the expression 9×4 , the answers will be the same as;

$9 \times 4 = \square \times \square$



2 The answer for 8×5 will be the same to the answer for 8×4 by adding 8.

$8 \times 5 = \square \times \square + \square$



Exercise

Let's find the number which applies to the \square .

① $8 \times 7 = \square \times 8$

② $9 \times \square = 3 \times 9$

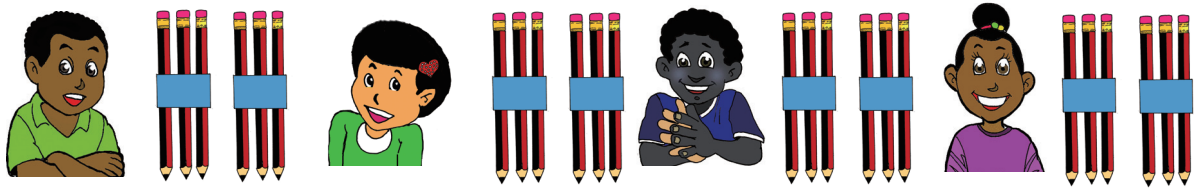
③ 4×6 is \square bigger than 4×5 .

④ 5×8 is \square smaller than 5×9 .

⑤ $7 \times 7 = 7 \times \square + 7$

⑥ $3 \times \square = 3 \times 7 - 3$

5 Each child receives two sets of 3 pencils. How many pencils are needed for 4 students?



Let's explain Naiko and Kekeni's ideas.

Naiko's idea
4 children with 2 sets each

$$4 \times 2 = 8$$

$$8 \times 3 = \square$$

8 sets of 3 pencils

How many sets for 4 children?

Kekeni's idea
2 sets of 3 pencils

$$2 \times 3 = 6$$

$$4 \times 6 = \square$$

4 children with 6 pencils each

At first, how many pencils are there for each child?

Let's make one expression.

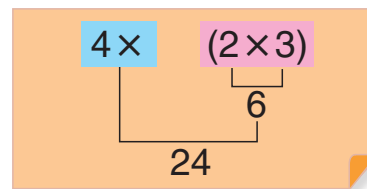
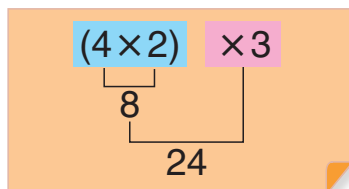
$$4 \times 2 \quad \times 3$$

The number of sets The number of pencils for each child

$$4 \times \quad 2 \times 3$$

The number of children The number of pencils for each child

$$(4 \times 2) \times 3 = 4 \times (2 \times 3)$$



Brackets shows the order of calculation.



When multiplying several numbers, the answer does not change even if you switch the order of calculation.

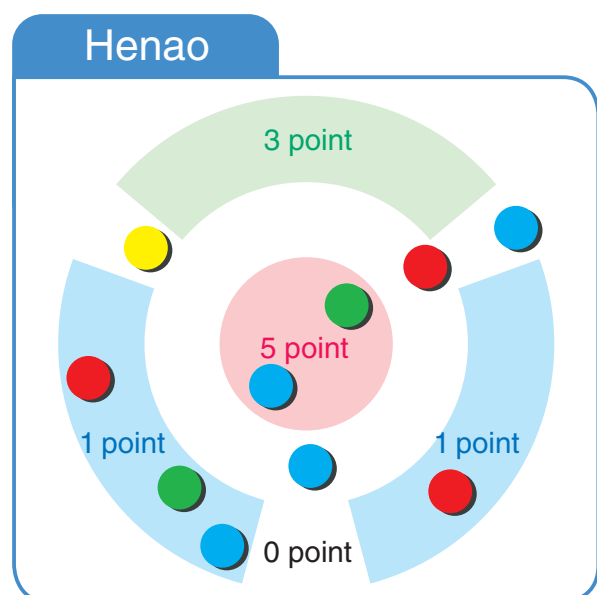
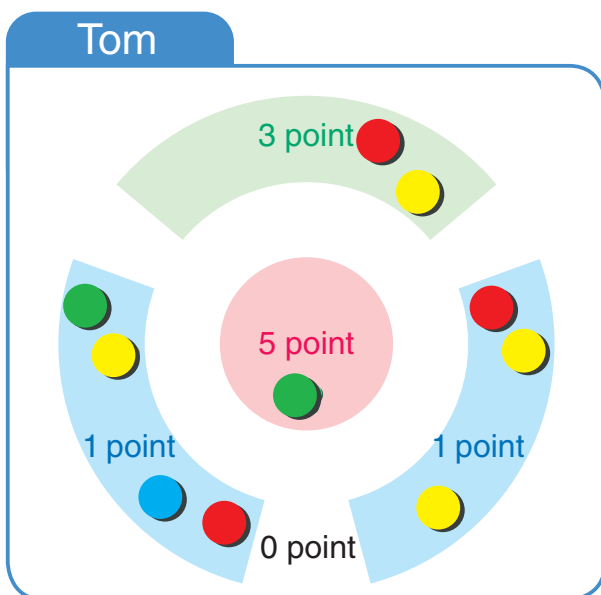
6 Let's change the order of multiplication using brackets to check if the answers are the same. See example **1** $2 \times 3 \times 3$.

1 $2 \times 3 \times 3$	or	$2 \times 3 \times 3$	2 $2 \times 4 \times 3$	3 $2 \times 2 \times 3$
$= (2 \times 3) \times 3$		$= 2 \times (3 \times 3)$		
$= 6 \times 3$		$= 2 \times 9$		
$= 18$		$= 18$		

2 Multiplication with 0

Point Scoring Game

In this game, you toss the bottle caps and gain point cards according to where the bottle caps stop. When 10 bottle caps are tossed, the team with the higher score wins.



$$54 = \square \times \square$$

1 Let's see how many points Tom has.

Tom's points table

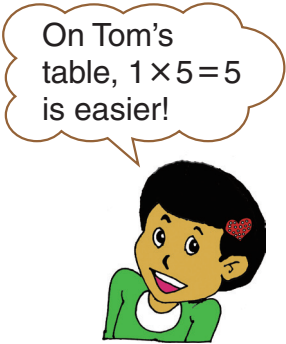
Points on card	5	3	1	Total
Number of cards obtained	1	2	7	10
Total points				

1 card of 5 points $1 \times 5 = 5$

2 cards of 3 points $2 \times \square = \square$

7 cards of 1 point $7 \times \square = \square$

Number of cards
 Points on card
 Total points



2 Let's see how many points Henao has.

Henao's points table

Points on card	5	3	1	0	Total
Number of cards obtained	2	0	4	4	10
Total points					

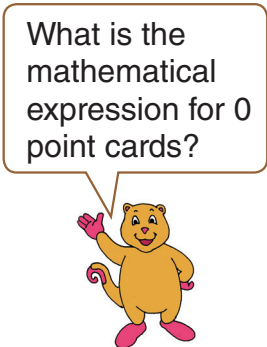
1 Write the mathematical expressions for finding the total points.

2 cards of 5 points 2×5

0 card of 3 points \square

4 cards of 1 point \square

4 cards of 0 point \square



Let's think about how to find the answer for the multiplication with 0 later.

- 2 How can we find the total points for 0 cards of 3-point card?

$$0 \times 3 = \square$$

$3 \times 3 = 9$	Reduced by <input type="checkbox"/>
$3 \times 2 = 6$	
$3 \times 1 = 3$	
$3 \times 0 = \square$	

- 3 How can we find the total points for 4 cards of 0-point card?

$$4 \times 0 = \square$$

$3 \times 4 = 12$	Reduced by <input type="checkbox"/>
$2 \times 4 = 8$	
$1 \times 4 = 4$	
$0 \times 4 = \square$	

2 3 The score for the 4 point card.

In the multiplication, the answer will be reduced by 4 every time the multiplier is reduced by 1.

$4 \times 1 = 4$, so if the multiplicand is reduced by 1, the answer is reduced by 4, which makes $4 \times 0 = 0$.

Answer 0 points

$4 \times 5 = 20$	Reduced by 4
$4 \times 4 = 16$	
$4 \times 3 = 12$	
$4 \times 2 = 8$	
$4 \times 1 = 4$	
$4 \times 0 = ?$	

What is the total points for Henao? In the point scoring game, what does the expression 0×0 mean?



Whenever the multiplier is 0, the answer will be 0. Also, multiplying 0 to any number, the answer will be 0.

	Multiplicand								
Multiplier	1	2	3	4	5	6	7	8	9
0									

Fill in the multiplication table of 0.



Exercise

- 1 6×0 2 4×0 3 0×7 4 0×5 5 0×0

3

Multiplication with 10

1 How many stickers are there altogether?



1 Write two mathematical expressions to calculate the total number of stickers.

$$\square \times \square$$

$$\square \times \square$$



Using the rules of multiplication, think about how to multiply using 10.

2 Let's think about how to find the answer for 5×10 .



Sare's idea

In the multiplication table of 5, the answer will increase by 5.

$$\begin{array}{l} 5 \times 9 = 45 \\ 5 \times 10 = 50 \end{array} \quad \text{Increased by 5}$$



Ambai's idea

Split multiplicand 10 into 2 and 8.

$$\begin{array}{r} 5 \times 10 \quad \left\{ \begin{array}{l} 5 \times 2 = 10 \\ 5 \times 8 = 40 \end{array} \right. \\ \hline \text{In total } 50 \end{array}$$

3 Let's think about how to find the answer for 10×5 .



Splitting 10 into 7 and 3, will produce 7×5 and 3×5 ...

Using the rule of multiplication...

Try writing the multiplication table of 10 in the table.



Exercise

1 Let's calculate.

① 6×10

② 8×10

③ 10×4

④ 10×9

2 Find the answer for 10×10 .



E x e r c i s e



1 Let's calculate.

Pages 56 ~ 61



- ① 9×0 ② 7×0 ③ 0×8 ④ 0×2
 ⑤ 4×10 ⑥ 7×10 ⑦ 10×8 ⑧ 10×7
 ⑨ $3 \times 2 \times 4$ ⑩ $4 \times 2 \times 5$ ⑪ $3 \times 3 \times 10$

2 Let's find the number which goes in .

Pages 48 ~ 51



- ① $3 \times 8 = 8 \times \text{[]}$ ② $4 \times \text{[]} = 6 \times 4$
 ③ $7 \times 5 = 7 \times 4 + \text{[]}$ ④ $6 \times \text{[]} = 6 \times 5 - 6$
 ⑤ $(3 \times 3) \times 2 = 3 \times (\text{[]} \times 2)$ ⑥ $7 \times (2 \times 4) = 7 \times \text{[]}$

3 Let's find the number which goes in .

Page 55

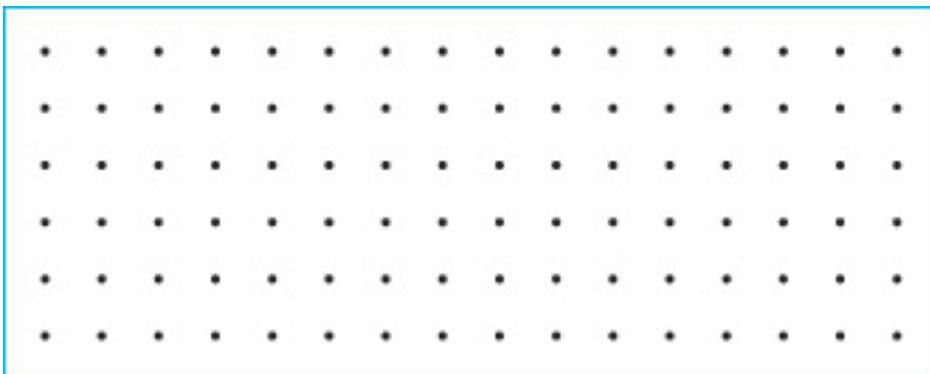
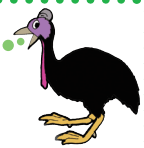


- ① 8×7 $\left\{ \begin{array}{l} 8 \times 3 = \text{[]} \\ 8 \times \text{[]} = \text{[]} \end{array} \right.$
 In total
- ② 9×6 $\left\{ \begin{array}{l} 9 \times 6 = \text{[]} \\ 9 \times \text{[]} = \text{[]} \end{array} \right.$
 In total

Draw triangles and squares by connecting dots with straight lines.

Grade 2

Do you remember?





1 Let's find the number which goes in the .

● Understand the rules of calculating and multiplying by 0.

- ① $0 \times 6 = \square$ ② $1 \times 0 = \square$ ③ $5 \times 6 = \square \times 5$
 ④ 3×9 is larger than 3×8 by
 ⑤ 4×3 is smaller than 4×4 by

2 Let's calculate the following.

● Multiplication with 0, 10 and using the brackets.

- ① 0×9 ② 8×0 ③ 0×0 ④ 2×10
 ⑤ 10×6 ⑥ $(2 \times 2) \times 5$ ⑦ $4 \times (2 \times 3)$ ⑧ $(2 \times 5) \times 9$

3 A point scoring game was played using bottle caps.

Let's find the total points gained by Mea.

● Multiplication with 0 and 10.

Mea's Score

Points on card	0	2	5	10	Total
Number of cards obtained	3	0	4	3	
Total points					

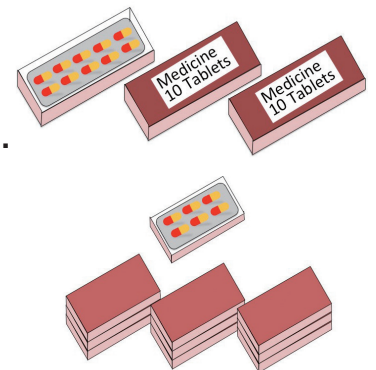
4 There are 3 boxes of 10 capsules of medicine and 10 boxes of 6 capsules each.

How many capsules are there altogether?

Express as one expression only

and calculate it.

● Solving a story problem by developing the expression.



Thinking about How to Calculate

- ▶▶ Let's write an expression to calculate the total number of lollies by filling in the blanks with various numbers and find the answers.

There are 4 packets of lollies. There are lollies in each packet. How many lollies are there altogether?

$$4 \times \square$$



I can quickly get the answer if the is from 1 to 9!

How can we get the answers if the number is 12 or 18 in ?

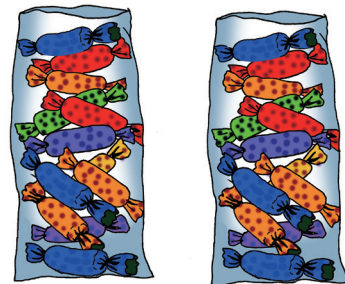
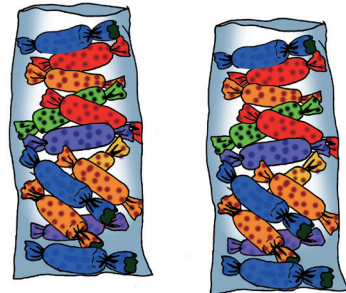


- 1** There are 4 packets of lollies, each packet with 12 lollies inside. How many lollies are there altogether?
Write down the multiplication expression for the total number of lollies.

$$\square \times \square$$

Number of packets

Number of lollies for each packet



- ▶▶ Let's reflect on what you have learned, and think about ideas for calculating by using multiplication table.



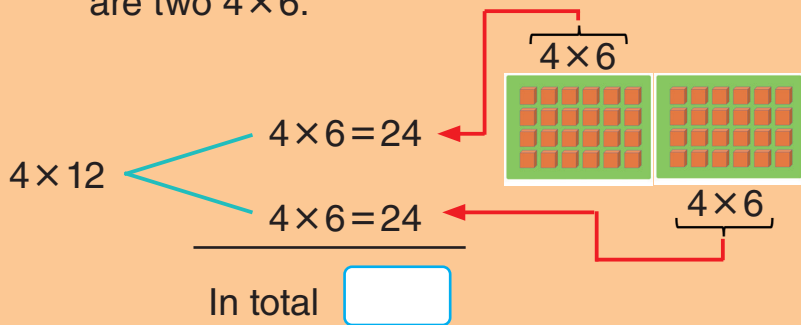
Let's think about how to calculate it, and explain using diagrams and expressions.



Yamo's idea

12 can be split into 6 and 6, so there are two 4×6 .

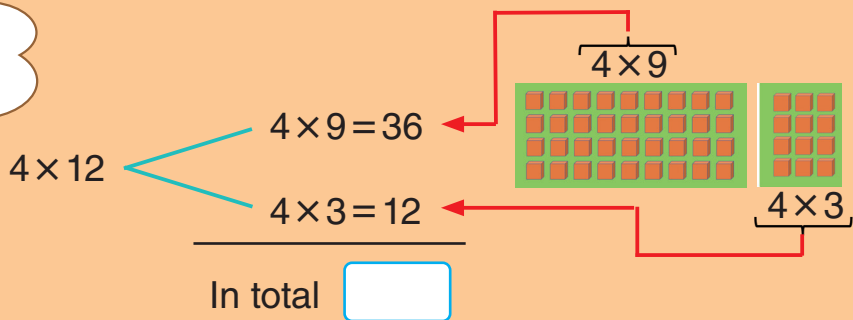
I used only one multiplication.



Gawi's idea

12 can be split into 9 and 3,

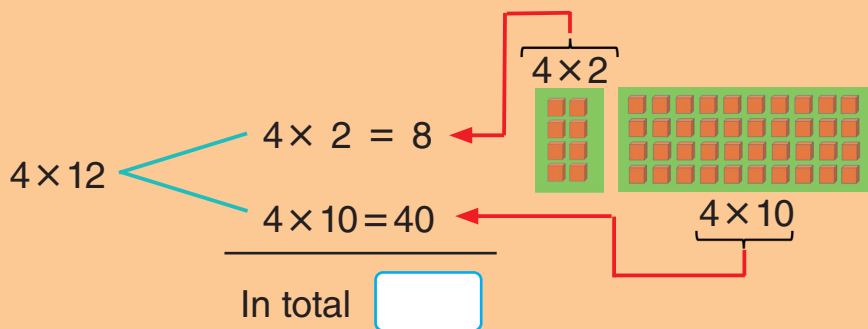
I used two multiplications of 4. I can use other pairs of multiplications as well !



Keken's idea

Multiplying 10s are easy, so splitting 12 into 2 and 10 will make,

In this calculation. I split 12 into ten and ones.



2 Let's find the answer for 4×18 in the various methods.

Duration and Time

- ▶▶ Let's challenge standing on one foot while closing one eye.
How long can you stand? Ready to go!



1 Short Duration

- 1 Let's stand on one foot with closing an eye.

Who stands the longest ?



How can we compare?



How can we choose the winner?



Let's investigate how to present short time.



Seconds are time units shorter than 1 minute.

1 minute = 60 seconds



Using a stopwatch, let's record the duration of how long you can stand on one foot?

The Time Taken on One Foot

Name	Time (seconds)

2 The table on the right shows the time that Bethel and other students who stood on one foot. Who stood the longest?

Name	Time
Bethel	1 minute 38 seconds
Fred	1 minute 47 seconds
Jeff	104 seconds

1 Let's represent the time using only seconds, then fill in the blanks.

Bethel: 1 minute 38 seconds = seconds

$$\begin{array}{r} 38 \\ + 60 \text{ (1 minute)} \\ \hline \end{array}$$

Fred: 1 minute 47 seconds = seconds

2 Let's represent the duration of time using minutes and seconds.

Jeff: 104 seconds = minutes seconds

$$\begin{array}{r} 104 \\ - 60 \text{ (1 minute)} \\ \hline \end{array}$$

3 Let's record the time taken for a paper airplane flight, and record many other time represented by different situation.

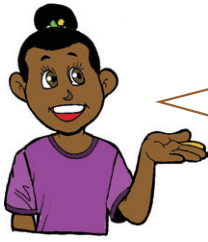


Air Niugini Timetables



MONDAY				
FLT	DEP	FROM	TO	ARR
PX852	06:25	POM	PNP	07:00
PX853	07:25	PNP	POM	08:00
PX906	08:45	POM	TBG	10:50
	11:15	TBG	UNG	11:40
PX905	12:05	UNG	POM	14:05
PX964	14:55	POM	GKA	16:05
PX965	16:30	GKA	POM	17:40

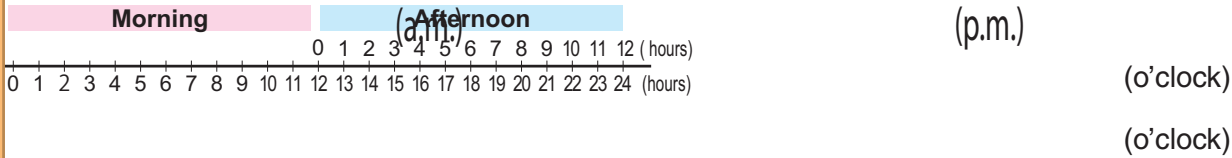
Let's look at how flight timetables are written. The table above shows a flight schedule. The words "p.m." and "a.m." are not used. Why?



The first flight from Port Moresby (POM) to Popondetta (PNP) starts off at 25 past 6 a.m. The next one leaves at quarter to 9 a.m. for Tabubil (TBG).



PX 905 from Kiunga (UNG) arrives at 14:05, meaning 5 past 2 p.m.



- Read the following times
 - ① 5:00 ② 9:30 p.m. ③ 6:23 ④ 8:50 ⑤ 4:15 p.m.

2 Read time in two ways using "a.m." or "p.m." and without using them.

Morning

Afternoon

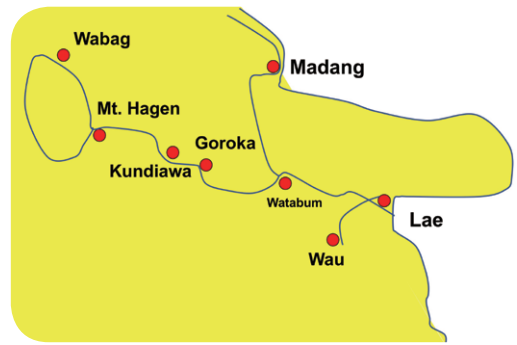
Morning

Afternoon

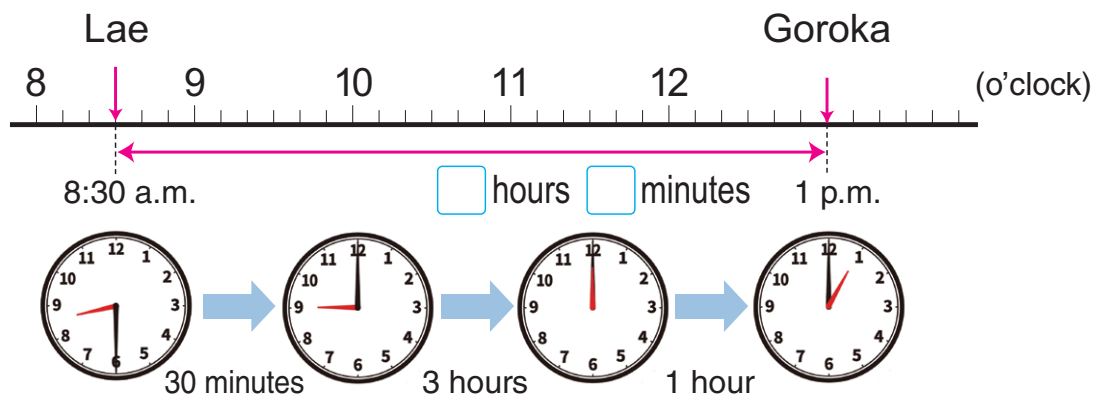
3 Write the time that your teacher says.

2 Duration and Time

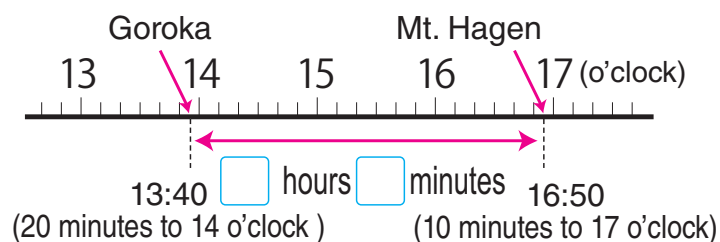
- 1 Asa wants to travel the highlands highway from Lae to Mt. Hagen. He thought about the duration which will take him to reach there.



- 1 If he leaves Lae at 8:30 a.m. and arrives in Goroka at 1:00 p.m., how long will it take him from Lae to Goroka?



- 2 If he will board another bus from Goroka to Mt. Hagen and the bus departs Goroka at 13:40, he will arrive in Mt. Hagen at 16:50. How many hours and minutes will it take him to reach Mt. Hagen from Goroka?



Mathematical expression: $16:50 - 13:40$

o'clock	minutes
16	50
- 13	40
—	—
<input type="text"/>	<input type="text"/>
hours	minutes

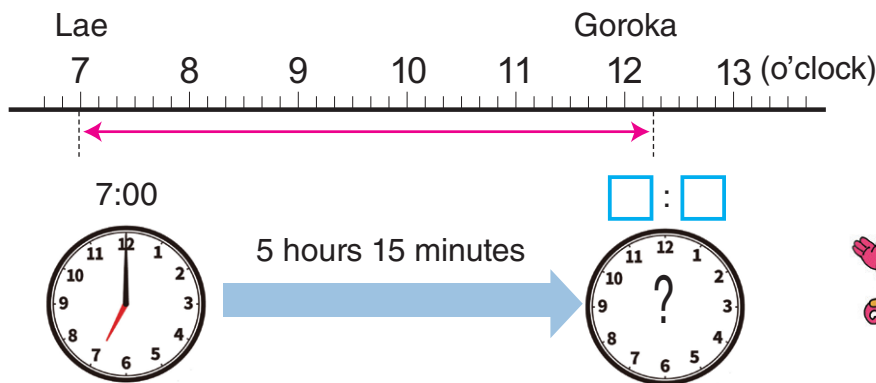


We can think with clocks.

Calculate hours and minutes independently, right?



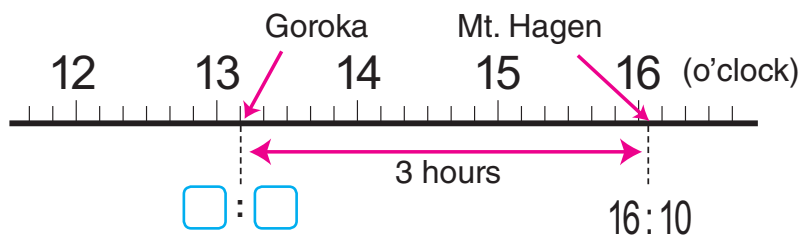
- 3 If you board both buses at 1 and 2, how long will it take you in total by bus? Answer in hours and minutes?
- 4 The bus “Tulait Tulait” leaves Lae city at 7 o'clock, it will take the duration of 5 hours and 15 minutes to reach Goroka town. At what time will it reach Goroka town?



The time is shown as ○ o'clock △ minute but the duration is expressed by ○ hours and □ minutes



- 5 The bus will arrive in Mt. Hagen at 16:10 from Goroka. It will take the duration of 3 hours to reach Mt. Hagen from Goroka. What time will it leave Goroka town?



When subtracting the duration of 3 hours change it to 3:00 for the calculation.



Mathematical expression: $16:10 - 3:00$

$$\begin{array}{r} 16:10 \\ - 3:00 \\ \hline \square \quad \square \\ \text{hours} \quad \text{minutes} \end{array}$$

Exercise

- 1 Ray was reading from 4:40 in the afternoon to 5:25 in the afternoon of the same day. How many minutes did he spend reading?
- 2 If you leave your house at 40 past 9 in the morning, and it took you the duration of 1 hour and 30 minutes to reach the garden. At what time in the morning will you reach the garden?



1 Let's write the correct number in the following .

- ① 1 minute = seconds
- ② 1 minute 20 seconds = seconds
- ③ 180 seconds = minutes

2 Vali and Utu participated in the town running. Vali finished the marathon in 5 minutes and 43 seconds. Utu finished the marathon 25 seconds later than Vali's time. What was Utu's record ?



3 One Sunday morning, Tim read a book for 1 hour and 10 minutes, and later read for 45 minutes in the afternoon. In total, how long did Tim read that Sunday?



4 Sandy attended soccer practice from 9:30 to 11:10 in the morning. How many hours and minutes did she practice?



5 It takes 25 minutes from Rui's home to the bus stop. To board the bus leaving at 10 minutes past 10 hours in the morning, at what time would she have to leave her home?



Let's calculate.

Grade 3

Do you remember?

① 4×0	② 1×0	③ 0×3	④ 0×9
⑤ 7×10	⑥ 5×10	⑦ 10×3	⑧ 10×6

1 Arrange the duration of time in order from the longest.

● Understanding units and duration of time.

- 15 hours 1 day 3 hours 45 minutes
- 75 seconds 60 minutes

2 Let's write numbers in the .

● Understanding the relationship between units.

- ① 3 minutes = seconds
- ② 1 minute 40 seconds = seconds
- ③ 125 seconds = minutes seconds
- ④ 2000 seconds = minutes seconds

3 Let's write the units of time which fits in the .

● Using units of time correctly.


- ① The duration you took to eat breakfast: 20 .
- ② The duration you took to run 50 m: 13 .
- ③ The duration you took for a school trip: 7 .

4 A class period is 30 minutes long. If the class starts at 10 minutes after 10 o'clock, when does the class end?

● Getting time by using calculation.

How Long Is the Duration of 3 Minutes?

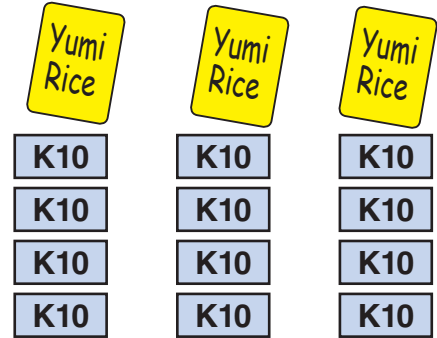
How long is the duration of 3 minutes? Please guess the time with your eyes closed. Close your eyes, count in your mind after the start sign. Then raise your hand when you counted 3 minutes. Please measure your time using stopwatch. Let's find out something in the duration of 3 minutes.



Multiplication in Vertical form

1 Multiplication with Tens and Hundreds

- 1 A mother bought 3 rice bags for 40 kina each. How much is the total cost altogether?



- 1 Write the mathematical expression.

$$\boxed{} \times \boxed{}$$

Number of rice bags Cost of one rice bag

3 times 40,
 $40 + 40 + 40 = 120$, easy to add!
 How can we calculate 40×3 ?



We know that we can change the order of multiplication, so $3 \times 40 = 40 \times 3$.



Let's think about how to calculate 40×3 .

$$4 \times 3 = \boxed{}$$

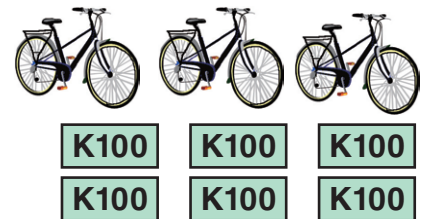
$$40 \times 3 = \boxed{}$$

How many K10 notes are there?



- 2 Twelve 10 kina notes equals .

- 2 There are 3 bicycles for 200 kina each. How much is the total cost altogether?



- 1 Six 100 kina notes equals .

$$2 \times 3 = \boxed{}$$

$$200 \times 3 = \boxed{}$$

Exercise

Let's calculate.

- ① 20×3 ② 30×5 ③ 80×2 ④ 50×6
 ⑤ 300×2 ⑥ 400×3 ⑦ 600×4 ⑧ 800×5

2 How to Calculate (2-digit numbers) × (1-digit number)



Your students have worked very hard. You should find some chocolates for them. How much money do you have?

I could buy these chocolates with K3.00 each. How much would be the total?

1 Teacher bought 21 chocolates which cost 3 kina each for a class party. How much is the total cost of chocolates altogether?

1 Write an expression to find the total cost.

×
 Number of chocolates Cost of one chocolate

If we change the order of multiplication, how can we find the answer?



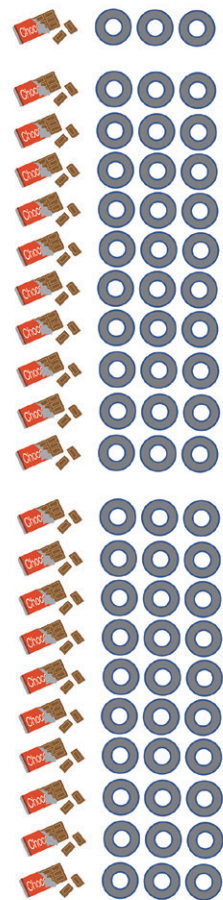
2 Let's think about how to calculate 21×3 .



Can we use the multiplication table?

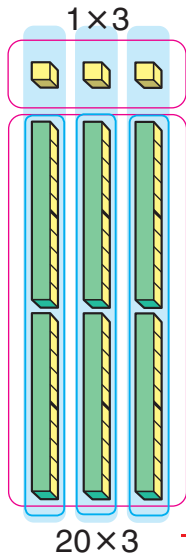


Let's think about how to calculate (2-digit numbers) × (1-digit number).



$$21 \times 3$$

Considering How to Calculate 21×3



Using the place values, 21 split into 1 on ones and 2 on tens. We can calculate 1×3 and 20×3 .

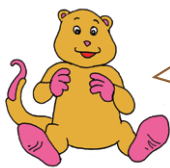
$$21 \times 3 \begin{cases} 1 \times 3 = \square \\ 20 \times 3 = \square \\ \hline \text{Total } \square \end{cases}$$

There are 3×2 sets of 10's blocks.

There are 3 sets of 20 blocks.

- 3 For calculating multiplication, we can use vertical form. Let's explain how to multiply 21×3 in vertical form.

$$\begin{array}{r} 21 \\ \times 3 \\ \hline \end{array}$$



Using the row of the multiplier in the multiplication table makes the calculation easier. When multiplying vertically, we swap the order of multiplication.

Multiplication Algorithm for 21×3 in Vertical Form

Exercise

Let's multiply in vertical form.

① 34×2

② 23×3

③ 42×2

④ 11×4

2 Let's think about how to multiply in vertical form.

1 71×4

$$\begin{array}{r} 71 \\ \times 4 \\ \hline \square \end{array} \rightarrow \begin{array}{r} 71 \\ \times 4 \\ \hline \square \square 4 \end{array}$$

28 means 28 sets of what?

4 multiplied by 1 equals 4.
 is in the ones place.

4 multiplied by 7 equals 28.
 8 is in the tens place.
 is in the hundreds place.



2 13×7

$$\begin{array}{r} 13 \\ \times 7 \\ \hline 21 \end{array} \rightarrow$$

$$\begin{array}{r} 13 \\ \times 7 \\ \hline 21 \\ 7 \end{array} \rightarrow$$

$$\begin{array}{r} 13 \\ \times 7 \\ \hline \square \square \end{array}$$

7 multiplied by 3 equals 21.
 1 is in the ones place.
 2 of 10 is carried to the tens place.

2



7 multiplied by 1 equals 7.
 In the tens place, $7+2$ equals .



3 95×3

$$\begin{array}{r} 95 \\ \times 3 \\ \hline 15 \end{array} \rightarrow$$

$$\begin{array}{r} 95 \\ \times 3 \\ \hline 15 \\ 27 \end{array} \rightarrow$$

$$\begin{array}{r} 95 \\ \times 3 \\ \hline \square \square \square \end{array}$$

3 multiplied by 5 equals 15.
 is in the ones place.
 1 is carried to the tens place.

1



3 multiplied by 9 equals 27.
 $27+1 = \square$. The number in the tens place is . The number in the hundreds place is .



3 Let's think about how to multiply 46×7 in vertical form.

$$\begin{array}{r} 46 \\ \times 7 \\ \hline 42 \end{array} \rightarrow$$

$$\begin{array}{r} 46 \\ \times 7 \\ \hline 42 \\ 28 \end{array} \rightarrow$$

$$\begin{array}{r} 46 \\ \times 7 \\ \hline \square \square \square \end{array}$$

7 multiplied by 6 equals 42.
 2 is in the ones place.
 is carried to the tens place.

4



7 multiplied by 4 equals 28.
 is in the tens place.
 is in the hundreds place.

28+4



 **Exercise**

Let's multiply in vertical form.

① 93×3

② 41×5

③ 63×2

④ 30×8

⑤ 14×7

⑥ 13×5

⑦ 24×3

⑧ 49×2

⑨ 64×3

⑩ 85×9

⑪ 18×6

⑫ 26×4

⑬ 59×7


⑭ 35×9

⑮ 65×8

⑯ 84×6



1 Let's multiply in vertical form.

Pages 71 ~ 73 

① 15×3

② 24×4

③ 47×2

④ 12×6

⑤ 42×6

⑥ 63×7

⑦ 58×4

⑧ 74×9


⑨ 38×8

⑩ 35×6

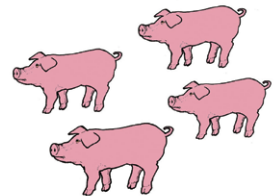
⑪ 80×4

⑫ 500×6

2 Kazu bought 4 piglets. 1 piglet costs 55 kina.

Page 70 

How much is the total cost altogether?



3 Make a phrase by arranging in order of putting the following letters from the lowest to the largest answer.

Pages 72 

T 73×8	S 87×9	H 93×8	V 68×4	O 30×9
A 57×8	M 42×9	I 12×8	E 46×6	L 31×5

「○○○○○○○○○○」

3

How to Calculate (3-digit numbers) × (1-digit number)

- 1** There are 213 children in a school.
Each child visited the fish pond 3 times in a week. How many times in a week did the children visit in total?



- 1** Write an expression.

Let's change the order of multiplication,
 $3 \times 213 = 213 \times 3$



- 2** Let's think about how to calculate 213×3 .

Considering How to Calculate 213×3

	3×3
	3×10
	3×200

$$\begin{array}{r} 3 \times 3 = 9 \\ 3 \times 10 = 30 \\ 3 \times 200 = 600 \\ \hline \text{Total } \square \end{array}$$

There are × sets of 100.

Can we use the same method we used for 21×3 ?



- 3** Let's explain how to multiply in vertical form.

Multiplication Algorithm for 214×3 in Vertical Form

Ones place	Tens place	Hundred place
$\begin{array}{r} 213 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 213 \\ \times 3 \\ \hline 9 \end{array}$	$\begin{array}{r} 213 \\ \times 3 \\ \hline 39 \end{array}$

Exercise

Let's multiply in vertical form.

- ① 142×2 ② 423×2 ③ 312×3 ④ 121×4

2 Let's explain how to multiply by carrying numbers to the superior place values.

1

$$\begin{array}{r} 421 \\ \times \quad 3 \\ \hline 1263 \end{array}$$

2

$$\begin{array}{r} 461 \\ \times \quad 3 \\ \hline 1383 \end{array}$$

3

$$\begin{array}{r} 876 \\ \times \quad 7 \\ \hline 6132 \end{array}$$

4

$$\begin{array}{r} 334 \\ \times \quad 3 \\ \hline 1002 \end{array}$$

3 Let's explain how to multiply with '0' in vertical form.

1

$$\begin{array}{r} 320 \\ \times \quad 4 \\ \hline 1280 \end{array}$$

2

$$\begin{array}{r} 405 \\ \times \quad 8 \\ \hline 3240 \end{array}$$

3

$$\begin{array}{r} 700 \\ \times \quad 6 \\ \hline 4200 \end{array}$$

 **Exercise**

1 Let's multiply in vertical form.

- ① 321×4
- ② 413×3
- ③ 341×5
- ④ 731×9
- ⑤ 654×3
- ⑥ 235×6
- ⑦ 364×8
- ⑧ 749×7
- ⑨ 128×8
- ⑩ 429×7
- ⑪ 556×9
- ⑫ 667×6
- ⑬ 420×7
- ⑭ 302×9
- ⑮ 706×3
- ⑯ 600×2

2 Uncle James bought 8 airplane tickets for holidays that cost 525 kina each.

How much is the total cost?

4 Mental Calculation

1 A torch costs 24 kina. How much is the cost of 3 torches? Let's try to calculate the answer without vertical form. 24×3



Mathematical expression is 3×24 but let's change the order of multiplication for mental calculation.



Remember how to calculate in vertical form.

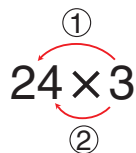


20×3 is 60, so the answer is larger than 60.

The answer is larger than 60 by $4 \times 3 = 12$, so...



To calculate 24×3 mentally, you do as shown on the right.



3 times 2 is 6, meaning 60.
3 times 4 is 12.
 $60 + 12 = 72$.



2 Let's calculate 76×4 mentally.

3 Aunty Marie bought 6 bags of kaukau for 65 kina each and 6 live chicken for 35 kina each. How much is the total cost?

For getting the answer easily, how should I calculate?



Exercise

Let's calculate mentally.

- ① 34×2
- ② 17×3
- ③ 25×6
- ④ 58×9

1 Let's calculate mentally.

Pages 72 ~ 75



① 33×3

② 76×8

③ 43×7

④ 56×4

⑤ 29×5

⑥ 94×6

⑦ 324×2

⑧ 254×6

⑨ 483×5

⑩ 112×9

⑪ 527×7

⑫ 638×8

2 Let's fill in the with an appropriate number.

For calculating 84×7 , we split it into $4 \times \text{[]}$ and $80 \times \text{[]}$ and then add the answers for the total.

Pages 72 ~ 75



3 Father purchased 6 boat tickets each costing 125 kina.
How much is the total cost?

Pages 74 ~ 76



4 There is a park which is 340 metres in perimeter near Roni's house. Roni ran around the park 4 times.
How many metres did he run in total?

Pages 74 ~ 76



Let's find the number which applies in the .

Grade 3 **Do you remember?**



① $5 \times 8 = \text{[]} \times 5$

② $7 \times \text{[]} = 3 \times 7$

③ $3 \times 6 = 3 \times 5 + \text{[]}$

④ $9 \times 4 = 9 \times \text{[]} - 9$

⑤ $(3 \times 3) \times 2 = 3 \times (\text{[]} \times 2)$

⑥ $7 \times 2 \times 4 = 7 \times \text{[]}$

1 Let's fill in the with an appropriate number.

● Understanding how to calculate $(3\text{-digit number}) \times (1\text{-digit number})$.

For calculating 384×7 , split the calculation into $7 \times \text{$, $7 \times \text{$ and $7 \times \text{$ and then add the answers for the total.

384×7	}	$7 \times 4 =$	<input type="text"/>
	}	$7 \times 80 =$	<input type="text"/>
	}	$7 \times 300 =$	<input type="text"/>
		Total	<input type="text"/>

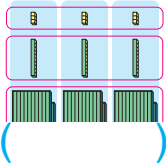
2 Let's calculate in vertical form.

● Understanding how to calculate in vertical form.

- | | | |
|------------------|------------------|------------------|
| ① 50×3 | ② 300×3 | ③ 600×7 |
| ④ 22×4 | ⑤ 45×6 | ⑥ 64×8 |
| ⑦ 223×3 | ⑧ 379×3 | ⑨ 584×5 |

3 Let's find the mistakes in the vertical calculations below and calculate the correct answer.

● Finding mistakes in calculations and calculate in the appropriate ways.

- | | | |
|---|--|--|
| ① | ② | ③ |
|  | $\begin{array}{r} 276 \\ \times 4 \\ \hline 804 \end{array}$ | $\begin{array}{r} 504 \\ \times 2 \\ \hline 108 \end{array}$ |

4 If you buy 8 sets of sports shoes and socks when one pair of shoe costs 125 kina and socks which costs 10 kina, how much is the total cost?

● Distinguishing the situations for the multiplication and calculate the answer.



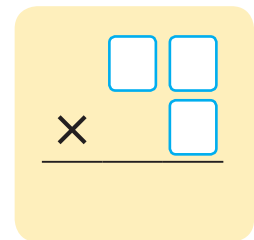
P r o b l e m s



- ① 3 adults and 3 children went to Mailu from Alotau by boat. The fare costs 60 kina for a child and 120 kina for an adult. What was the total cost?

● Distinguishing the situations for the multiplication and calculating the answer.

- ② There is a set of number cards from 0 to 9, one card for each number. Using these cards, make calculation problems for a (2-digit number) \times (1-digit number).



- ① Find a calculation with the largest answer.
 ② Find a calculation with the largest answer with 2-digits numbers. Also, explain why that is the largest answer.

● Making calculation problems with estimation.

- ③ There is a 3-digit number. If you multiply 3 to that number, the answer is shown below. In the same letter, the same number fits in. Think about a 3-digit number $\boxed{A} \boxed{B} \boxed{C}$.

$$\begin{array}{r}
 \boxed{A} \boxed{B} \boxed{C} \\
 \times \quad \quad 3 \\
 \hline
 4 \boxed{C} \boxed{A}
 \end{array}$$

Explain how you found the 3-digit number in order.

● Thinking about the vertical form.

Division

▶▶ There are 12 lollies. Let's share the lollies amongst 4 children.



Mum brought some lollies.

They are going to share them amongst 4 of them.



Just wait! Why do I have only 2?

Look I have 5!



Some kids are happy and some are sad.

It is not good that their distributed numbers of lollies are different.



▶▶ There are 12 lollies. Share 4 lollies to each child.



Then, distribute 4 lollies each to them.

Hmm, can everyone have lollies?



▶▶ Let's Discuss about the differences between the two stories.

1 Division

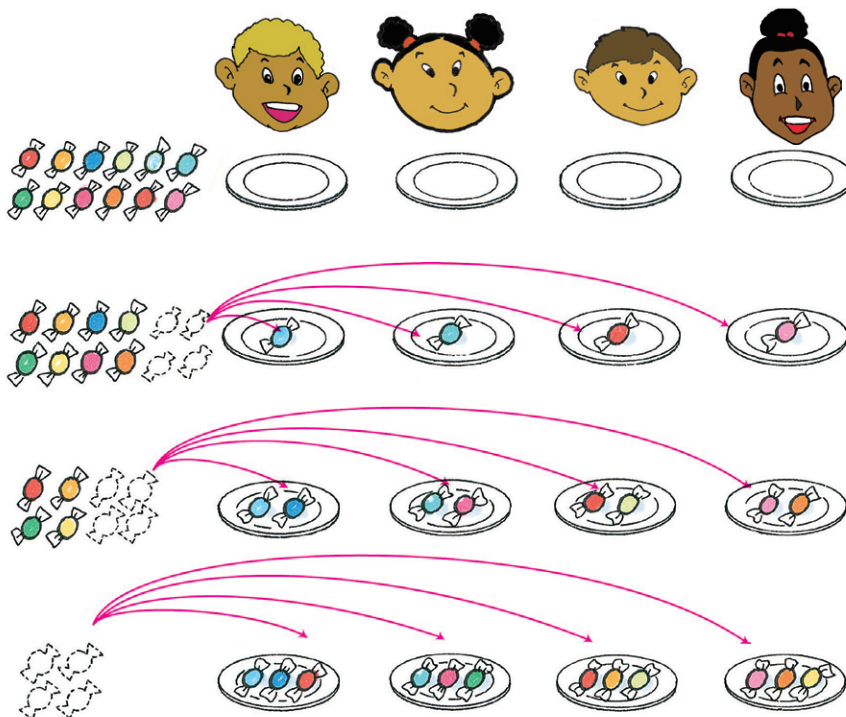
1 There are 12 lollies. If 4 children share them equally, how many lollies will be given to each child?

How many for each child?



Let's think about a calculation for distributing things equally.

They divided 12 lollies equally amongst 4 children as follows.



If you distribute one lolly to each child at a time...



Finally, 3 lollies are given to each child and nothing is left.

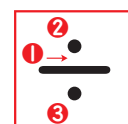


The number of lollies for each child is 3 lollies.



If you divide 12 lollies amongst 4 children equally, each child gets 3. In a mathematical sentence, it can be written as $12 \div 4 = 3$ and read as; 12 divided by 4 equals 3.

12	÷	4	=	3	
Total number		Number of children		Number of lollies for each child	<u>Answer 3 lollies</u>



2 Let's write mathematical sentences for the following story problems below, and find the number of blocks given to each person.

Share 6 blocks equally amongst 3 children.

$$\square \div \square = \square$$



Share 15 blocks evenly amongst 5 children.

$$\square \div \square = \square$$



Let's do this problem while putting other numbers for blocks and children.



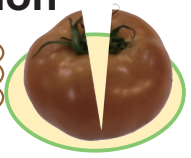
Calculations such as $12 \div 4 = 3$ and $6 \div 3 = 2$ are called **division**.

The divisions used in **1** and **2** are calculations to find how many lollies for each child when the total number of lollies are equally distributed to the number of children.

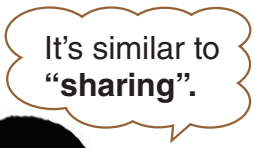
Meaning of "division"



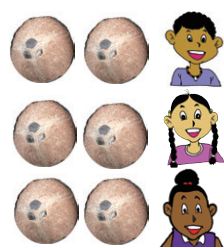
Dividing a pizza into 6 pieces equally.



Dividing a tomato equally.



Dividing coconuts evenly.



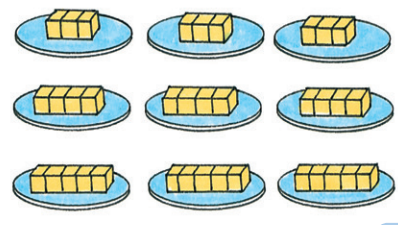
3 Divide 15 blocks equally amongst 3 children.

How many blocks does each one receive?

If each child gets 2, 2×3 is 6, so everyone can get more!



- 3 blocks for each child
- 4 blocks for each child
- 5 blocks for each child



$$3 \times \square = 9$$

$$3 \times \square = 12$$

$$3 \times \square = 15$$

Number of children	Blocks per child	Blocks in total
--------------------	------------------	-----------------



The answer to $15 \div 3$ is in the box in $3 \times \square = 15$.
The answer is found by using the the multiplication table of 3.

$15 \div 3 = \square$
Three threes are 9.
Four threes are 12.
Five threes are 15.



4 Divide 10 dL of juice equally amongst 5 children.

How many dL of juice does each child receive?



$$\square \div \square = \square$$

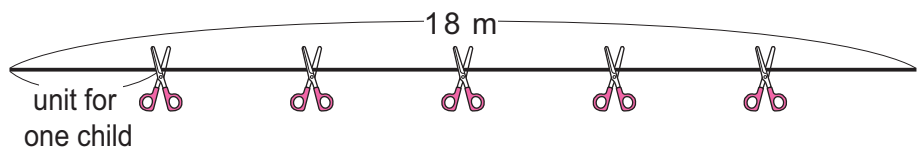
Answer: \square dL

Which column of the multiplication table should we use?



Exercise

1 Divide a 18 m skipping rope equally amongst 6 children.
How many metre (m) does each child receive?



2 Which column or row of the multiplication table should you use to do these division problems? Mention the column or row and find the answer.

① $8 \div 2$

② $21 \div 7$

③ $72 \div 9$

④ $28 \div 4$

⑤ $20 \div 5$

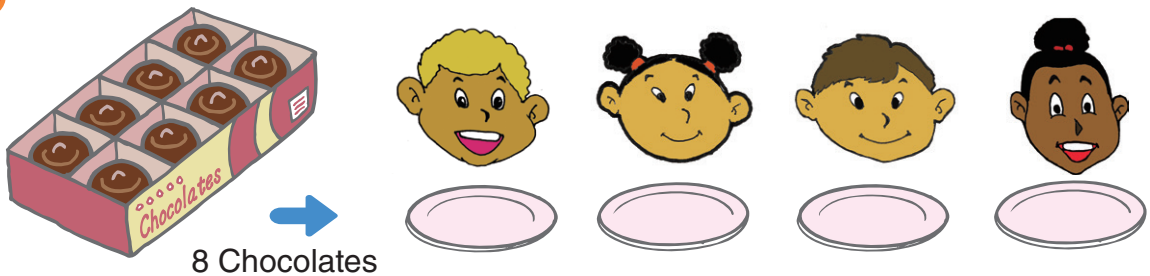
⑥ $56 \div 8$

⑦ $21 \div 3$

⑧ $54 \div 6$

5 Make a problem of equal sharing that is solved by division and by looking at the picture.

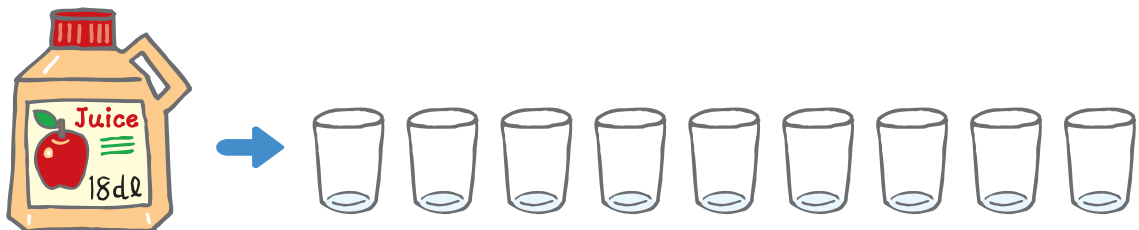
1



The problem developed by Asa

chocolates are divided equally among children. How many chocolates are given to each child?

2



6 Let's divide.

① $14 \div 2$

② $4 \div 2$

③ $27 \div 9$

④ $40 \div 5$

⑤ $32 \div 8$

⑥ $12 \div 2$

⑦ $18 \div 3$

⑧ $45 \div 9$

⑨ $42 \div 7$

⑩ $16 \div 8$

⑪ $24 \div 4$

⑫ $25 \div 5$

⑬ $12 \div 6$

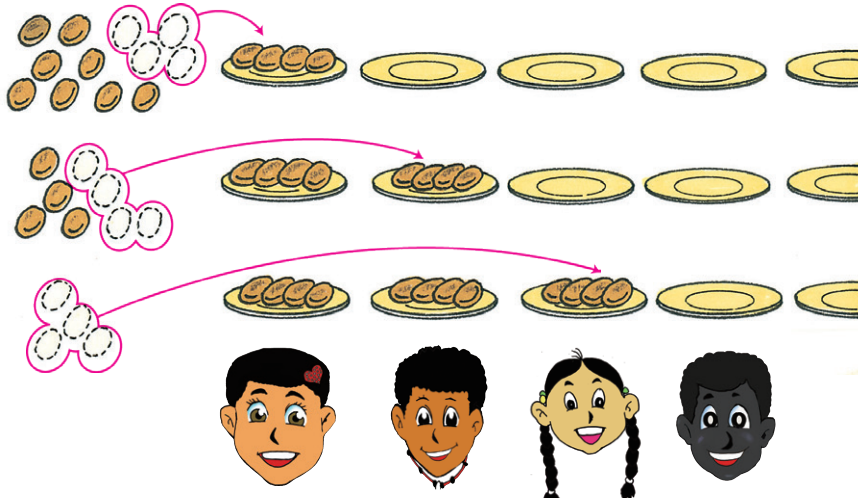
⑭ $49 \div 7$

⑮ $24 \div 3$

Calculate the Number of Children

7 There are 12 cookies. If one child receives 4 cookies only, how many children can receive cookies?

How many children can share?



If you give 4 cookies to each child...



Nothing is left when distributing 4 cookies each to 3 children.



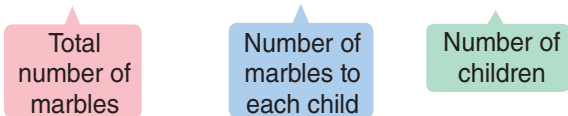
If you share 12 cookies to each child by 4 cookies each, it can be shared by 3 children. In a mathematical sentence, it can also be represented by the division and written as $12 \div 4 = 3$.

12	\div	4	$=$	3	
Total number of cookies		Number of cookies to each child		Number to children	<u>Answer: 3 children</u>

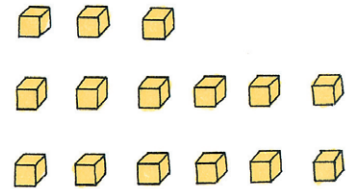
The division used in **7** is a calculation to find how many children can receive when the total number of things are distributed by the same number to each child.

8 There are 8 marbles. If you give 2 marbles to each child, how many children can share them?

\div = Answer: children



9 You share 15 blocks to each child by 3 each. How many children can share the blocks?



$$15 \div 3$$

For **3** children

$$3 \times 3 = 9$$

For **4** children

$$4 \times 3 = 12$$

For **5** children

$$5 \times 3 = 15$$

Number of children

Number of blocks to each child

Total number of blocks

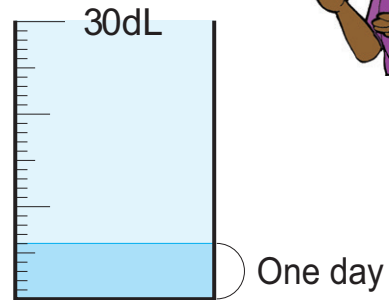


The answer for $15 \div 3$ is the number that fits in the box for $\square \times 3 = 15$.
The answer for $15 \div 3$ can be obtained by using the multiplication table of 3.

$15 \div 3 = \square$
Three threes are 9.
Four threes are 12.
Five threes are 15.



10 There are 30 dL of kerosene. If you use 6 dL for a kerosene stove for cooking in one day, how many days can you use?



$$\square \div \square = \square$$

Answer: \square days

Do you know!

Decilitre (dL, DL, dl) is a unit of measurement of volume. 10 dL = 1 litre (L)

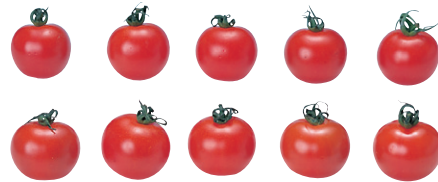


Exercise

There are 24 pencils. If you put 6 pencils only to each box, how many boxes do you need?

11

Look at the tomatoes on the right and make a story problem for $10 \div 5$.



Division to find the number of tomatoes in each plastic bag.

① Divide 10 tomatoes equally into plastic bags. How many are in each ?

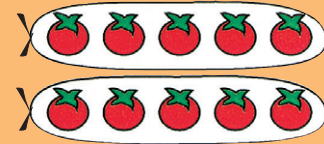
$$10 \div 5 = 2$$



Division to find the number of plastic bags.

② There are 10 tomatoes. tomatoes are distributed into each plastic bag. How many are needed?

$$10 \div 5 = 2$$



① is a calculation to find the number in the box for $5 \times \square = 10$.

② is a calculation to find the number in the box for $\square \times 5 = 10$.



Both answers can be calculated by the multiplication of 5 and 2 giving 10.



The Answer to a division problem can be calculated by using the multiplication table of divisor (In this case, 5)

10	÷	5	=	2
Dividend		Divisor		Answer

12

Let's make a story problem for $32 \div 8$.

Exercise

Let's calculate the following divisions. Which column or row of the multiplication table will you use to find the answer?

- | | | | | |
|---------------|---------------|---------------|---------------|---------------|
| ① $9 \div 3$ | ② $24 \div 8$ | ③ $10 \div 2$ | ④ $32 \div 4$ | ⑤ $35 \div 5$ |
| ⑥ $6 \div 2$ | ⑦ $36 \div 9$ | ⑧ $45 \div 5$ | ⑨ $14 \div 7$ | ⑩ $48 \div 6$ |
| ⑪ $20 \div 4$ | ⑫ $56 \div 7$ | ⑬ $48 \div 8$ | ⑭ $40 \div 8$ | ⑮ $81 \div 9$ |

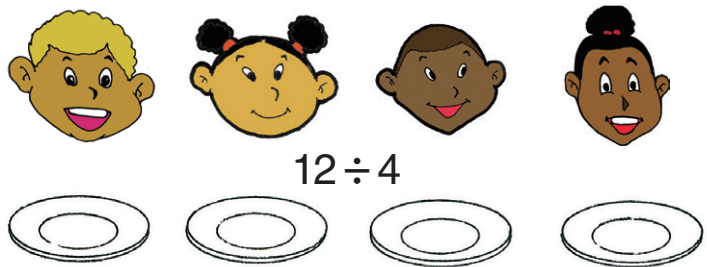
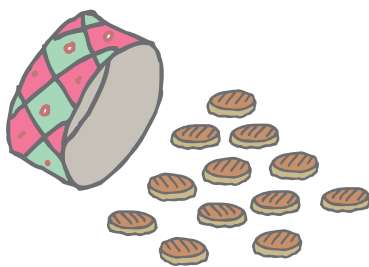
2

Division with 1 and 0

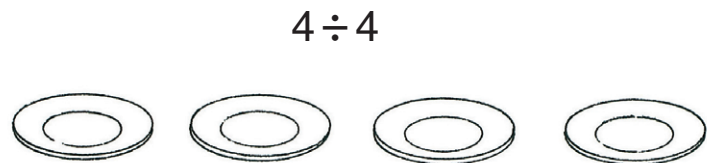
- 1** Cookies in a container will be shared by 4 children. Each one gets the same number of cookies. How many cookies will each person receive?



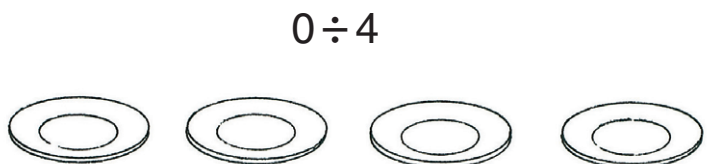
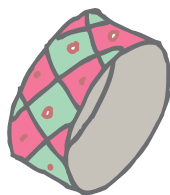
- 1** If there are 12 cookies,



- 2** If there are 4 cookies,



- 3** If there are 0 cookies,



- 2** There is a bottle of 6 dL juice. If you pour 1 dL per cup, how many cups do you need?



Exercise

- | | | | | |
|--------------|--------------|--------------|--------------|--------------|
| ① $6 \div 6$ | ② $9 \div 9$ | ③ $7 \div 7$ | ④ $0 \div 5$ | ⑤ $0 \div 8$ |
| ⑥ $3 \div 1$ | ⑦ $5 \div 1$ | ⑧ $1 \div 1$ | ⑨ $8 \div 1$ | ⑩ $0 \div 1$ |

3

Using Rules of Calculation

1 What is the answer for $36 \div 3$?



I will calculate using multiplication.

Let's line up the mathematical sentences of divisions in the case of divisor 3.



Vavi's idea

I use the relationship between division and multiplication.

$$1 \times 3 = 3 \rightarrow 3 \div 3 = 1$$

$$7 \times 3 = 21 \rightarrow 21 \div 3 = 7$$

$$2 \times 3 = 6 \rightarrow 6 \div 3 = 2$$

$$8 \times 3 = 24 \rightarrow 24 \div 3 = 8$$

$$3 \times 3 = 9 \rightarrow 9 \div 3 = 3$$

$$9 \times 3 = 27 \rightarrow 27 \div 3 = 9$$

$$4 \times 3 = 12 \rightarrow 12 \div 3 = 4$$

$$10 \times 3 = 30 \rightarrow 30 \div 3 = 10$$

$$5 \times 3 = 15 \rightarrow 15 \div 3 = 5$$

$$11 \times 3 = 33 \rightarrow 33 \div 3 = 11$$

$$6 \times 3 = 18 \rightarrow 18 \div 3 = 6$$

$$12 \times 3 = 36 \rightarrow 36 \div 3 = 12$$

From above, $36 \div 3 = 12$

Answer 12



Mero's idea

I line up division sentences of divisor 3.

$$3 \div 3 = 1 \quad 21 \div 3 = 7$$

$$6 \div 3 = 2 \quad 24 \div 3 = 8$$

$$9 \div 3 = 3 \quad 27 \div 3 = 9$$

$$12 \div 3 = 4 \quad 30 \div 3 = \square$$

$$30 \div 3 = 10$$

$$15 \div 3 = 5 \quad 33 \div 3 = \square$$

$$33 \div 3 = 11$$

$$18 \div 3 = 6 \quad 36 \div 3 = \square$$

$$36 \div 3 = 12$$

From above, $36 \div 3 = 12$

Answer 12

If the dividend increases by 3, the answer will also increase by 1.



1 Let's divide.

Pages 84, 85, 88, 89



- | | | | |
|---------------|---------------|---------------|---------------|
| ① $35 \div 7$ | ② $72 \div 9$ | ③ $18 \div 6$ | ④ $28 \div 4$ |
| ⑤ $12 \div 3$ | ⑥ $21 \div 3$ | ⑦ $20 \div 4$ | ⑧ $30 \div 5$ |
| ⑨ $64 \div 8$ | ⑩ $36 \div 6$ | ⑪ $8 \div 2$ | ⑫ $16 \div 2$ |
| ⑬ $81 \div 9$ | ⑭ $63 \div 7$ | ⑮ $42 \div 6$ | ⑯ $4 \div 1$ |
| ⑰ $8 \div 8$ | ⑱ $0 \div 2$ | ⑲ $69 \div 3$ | ⑳ $84 \div 4$ |

2 Let's find the number which applies to the .

Pages 84, 87



- | | |
|---------------------------|---------------------------|
| ① $5 \times \square = 15$ | ② $7 \times \square = 35$ |
| ③ $3 \times \square = 24$ | ④ $9 \times \square = 36$ |
| ⑤ $\square \times 6 = 42$ | ⑥ $\square \times 3 = 9$ |
| ⑦ $\square \times 4 = 32$ | ⑧ $\square \times 8 = 48$ |

3 There are 28 cookies.

Page 86



- ① If you distribute 4 cookies to each friend, how many can each friend receive?
- ② If you distribute the same number of cookies to 4 friends, how many cookies can each friend receive?



Let's calculate.

Grade 3

Do you remember?



- | | | | |
|------------------|------------------|------------------|------------------|
| ① 24×6 | ② 72×7 | ③ 56×8 | ④ 62×5 |
| ⑤ 284×3 | ⑥ 643×7 | ⑦ 206×9 | ⑧ 999×9 |



1 Distribute 36 sheets of coloured papers.

● Finding out how many to each person and how many persons.

① If you distribute the same number to 9 children, how many does one child get?

② If you distribute 9 papers to each child, how many children can receive?



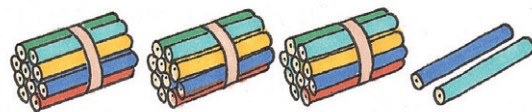
2 Let's calculate the following divisions.

● Using the multiplication table to calculate division.

- | | | | | |
|---------------|---------------|---------------|---------------|---------------|
| ① $27 \div 3$ | ② $30 \div 6$ | ③ $18 \div 2$ | ④ $56 \div 8$ | ⑤ $36 \div 4$ |
| ⑥ $20 \div 5$ | ⑦ $21 \div 7$ | ⑧ $63 \div 9$ | ⑨ $15 \div 5$ | ⑩ $42 \div 6$ |
| ⑪ $16 \div 4$ | ⑫ $49 \div 7$ | ⑬ $28 \div 7$ | ⑭ $54 \div 9$ | ⑮ $72 \div 8$ |
| ⑯ $7 \div 1$ | ⑰ $3 \div 3$ | ⑱ $0 \div 6$ | ⑲ $2 \div 1$ | ⑳ $5 \div 5$ |

3 Let's make a story problem for $32 \div 4$. Write a number or word which applies to the .

● Making a story problem from expression.



①

Division to Find the Number for Each

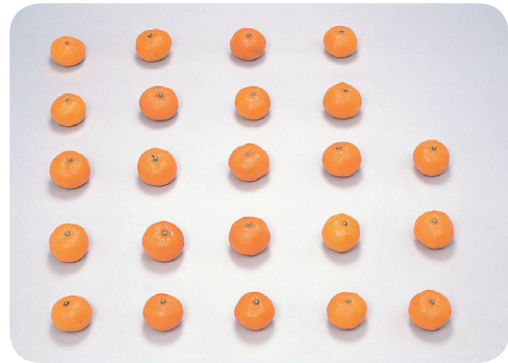
There are pencils distributed to friends equally. How many pencils can receive?

②

Division to Find the Number of Times

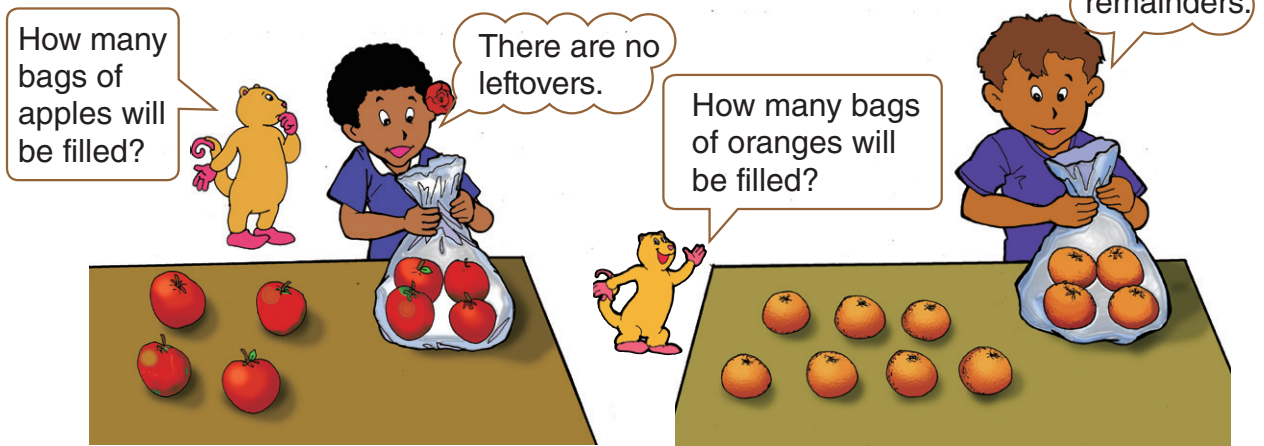
There are pencils. pencils are distributed to each friend. How many can receive?

Division with Remainders



▶▶ There are 20 apples and 23 oranges.

Put 4 of each type of fruits into separate bags.



1 Division with Remainders

1 There are 23 oranges. If you put 4 oranges into each bag, how many bags can you use?

1 Write an expression.

$$\boxed{} \div \boxed{}$$

Total number

Number to each bag

This is a calculation distributing the same number to each unit, so we can use division.



Is there any number that fit \square in $4 \times \square = 23$?



2 Let's think about how to calculate.

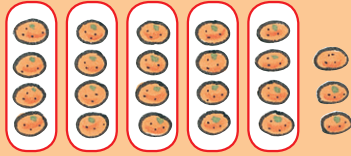


Let's think about how to calculate divisions with remainders.



Sare's idea

I circled groups of 4 oranges.



Ambai's idea

I used the column of 4 in the multiplication table.

For 4 bags, $4 \times 4 = 16$, 7 oranges remainder.

For 5 bags, $5 \times 4 = 20$, 3 oranges remainder.

Total **23**

For 6 bags, $6 \times 4 = 24$, 1 orange short.

There are 5 bags and 3 remainders.



We will write this as follows: $23 \div 4 = 5$ remainder 3

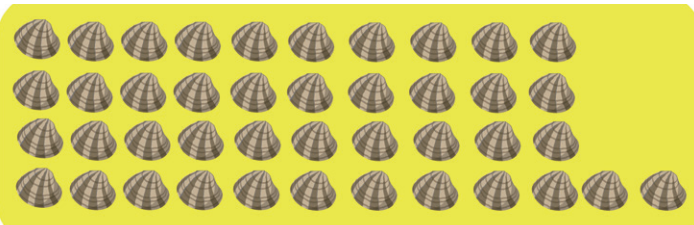
Answer: 5 bags and a remainder of 3 oranges



As in $23 \div 4$, if we have a **remainder**, it is called "**not divisible**". In other words, the dividend 23 is not divisible by divisor 4. In $20 \div 4$, if we have no remainder, it is called "**divisible**". In other words, the dividend 20 is divisible by divisor 4.

2

There are 42 shells distributed to 5 children equally. How many will each child receive and what will be the remainder?



Five nines is 45, it's too much, so how about five eights is 40?



Exercise

There are 34 cards. If they give 6 cards to each child, how many children can receive cards and what is the remainder?

Divisor and the Size of Remainder

3 Division problems in which the divisor is 4 are lined up on the right. Let's write the correct numbers in the .



The remainder in division should always be less than the divisor.

Dividend	Divisor	Answer	Remainder
12	÷ 4	= 3	
11	÷ 4	= 2	remainder 3
10	÷ 4	= 2	remainder 2
9	÷ 4	= 2	remainder 1
8	÷ 4	= 2	
7	÷ 4	= 1	remainder <input type="checkbox"/>
6	÷ 4	= 1	remainder <input type="checkbox"/>
5	÷ 4	= 1	remainder <input type="checkbox"/>
4	÷ 4	= 1	
3	÷ 4	<input type="checkbox"/>	remainder <input type="checkbox"/>
2	÷ 4	<input type="checkbox"/>	remainder <input type="checkbox"/>
1	÷ 4	<input type="checkbox"/>	remainder <input type="checkbox"/>

How to Check Answers

4 You must fill 8 candies to each bag from 26 candies.

1 How many bags will be filled and what is the remainder?

$$26 \div 8 = \boxed{} \text{ remainder } \boxed{}$$

2 Let's consider how to calculate for confirming the answer for the above division.



3	×	8	+	2	=	<input type="checkbox"/>
Number of bags		Number of candies to each bag		Remainder		Total number

Exercise

1 Fix the mistakes in the divisions below.

$$45 \div 6 = 6 \text{ remainder } 9 \qquad 55 \div 7 = 8 \text{ remainder } 1$$

2 Solve the calculation below and check the answers.

- ① $7 \div 4$ ② $22 \div 3$ ③ $47 \div 9$ ④ $50 \div 7$ ⑤ $33 \div 5$

2

Let's Solve Various Problems

1 There are 28 children in Saura's class.

If the class is divided into groups of 5 children, how many groups are made and what is the remainder?



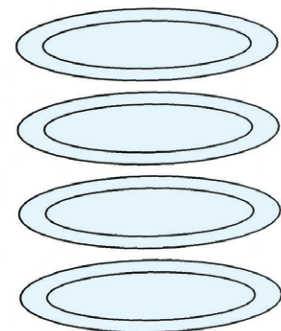
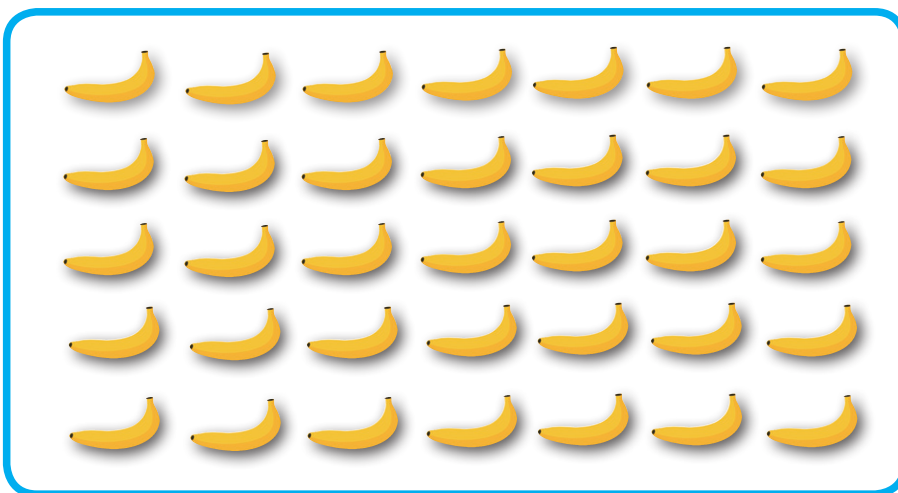
2 There are 40 balls.

Bill wants to put 6 balls in each box.

How many boxes will he need?



3 Let's make the division problems with remainders.



There are bananas and plates. Put an equal number of bananas on each plate. How many bananas will be on each plate and what will be the remainder?



1 Let's calculate and check the answers.

Page 94



① $29 \div 3$

② $36 \div 5$

③ $17 \div 6$

④ $43 \div 9$

⑤ $34 \div 7$

⑥ $55 \div 8$

2 There are 48 pencils. The same amount will be distributed to 7 children. How many pencils can be distributed to each child and what will be the remainder?

Page 96



3 There are 66 cards.

Pages 94 ~ 96



If the same amount is distributed to 9 children, how many cards will each child get and what will be the remainder?

If 9 cards are distributed to each child, how many children can receive and what will be the remainder?

4 There are 30 oranges. You will put these oranges in each plastic bag.

In each bag, 4 oranges can fit.

In order to put all the oranges in the plastic bag, how many plastic bags do you need?



Page 96



Solve the calculations below.

Grade 3

Do you remember?



① $595 - 288$

② $460 - 132$

③ $906 - 742$

④ $892 - 625$

⑤ $1234 - 695$

⑥ $1006 - 759$

⑦ $5613 - 3424$

⑧ $7411 - 5079$

⑨ $9000 - 8021$



1 Let's find the mistakes in the following calculations?

Write the correct answer in the .

Understanding the meaning of the division with remainder.

$28 \div 3 = 8$ remainder 4

$37 \div 5 = 8$ remainder 3

2 There are 46 tomatoes. They will be divided equally amongst 6 people.

Considering the remainder depending on the story.

- 1 How many tomatoes can be distributed to each person and what will be the remainder?
- 2 How many more tomatoes do you need to distribute 8 to each person?



3 Let's calculate.

Perform divisions with remainders.

- 1 $33 \div 8$
- 2 $48 \div 5$
- 3 $17 \div 4$
- 4 $26 \div 7$
- 5 $56 \div 9$
- 6 $41 \div 6$
- 7 $11 \div 2$
- 8 $39 \div 7$
- 9 $74 \div 9$

4 There are 11 plastic bottles of juice in total. 4 plastic bottles of 2 L and 7 plastic bottles of 1 L. If you distribute equally amongst 3 people, what are the possible methods?

Considering the various ways of distributions.



Circles and Spheres

▶▶ We will play ring game. How should we line up for a fair game?



A, B and C are various formations. In each, which formation is fair for everybody?

Explain why you chose your answer.

Let's think about how we can have everybody at an equal distance to the target.



A



B



C

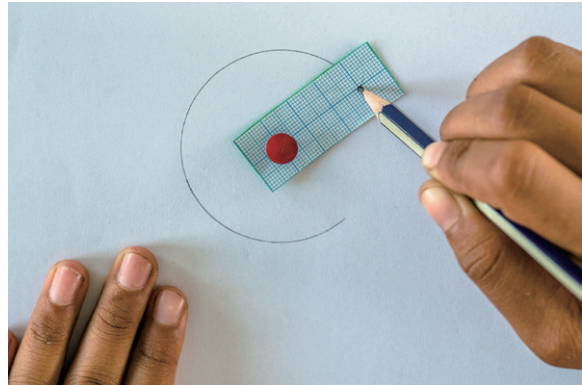


It looks like a round shape!

All students are playing fairly.

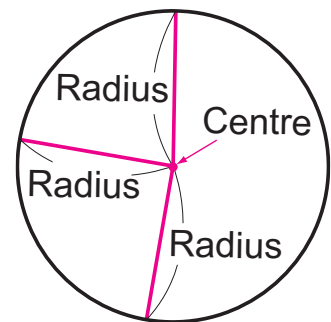
1 Circles

- 1 Let's think about how to draw a round shape.
 - 1 Draw many points that are all 3 cm from point A.
 - 2 Using an instrument below, draw a round shape.



A round shape that has the same distance from one point is called a circle. This point is called the centre.

The straight line from the centre to any point on the circle is called the radius.



The circle you drew in **1** has a radius of 3 cm. Point A and the pin is the centre of the circle.

- 2** Let's draw a circle with a 2 m radius in the school ground using a rope.



This is a circle.



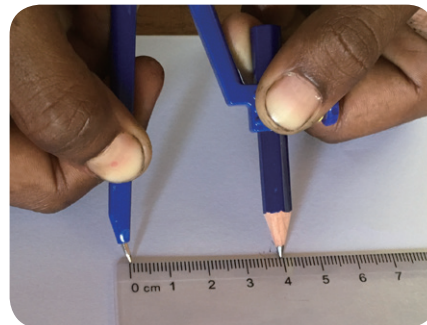
Play target shooting game from around the circle!



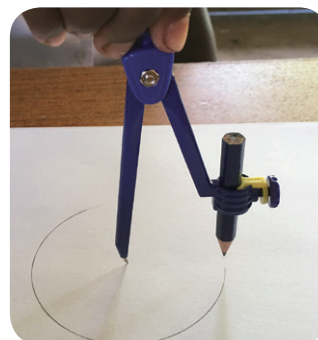
- 3** A compass is a tool used for drawing circles.

- 1** Draw a circle with a 4 cm radius using a compass.

- 1** Open the compass to the length of the radius.



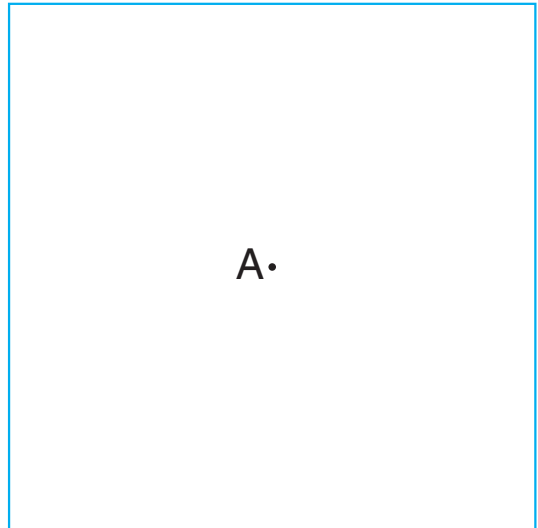
- 2** Rotate the compass to draw a circle.



- 2** Draw another circle with a different radius and the same centre.

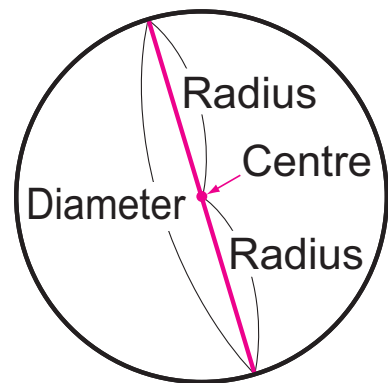
Radius and Diameter

- 4** Draw a circle with A as the centre.
- 1 Draw a circle with radius of 3 cm.
 - 2 Draw a straight line from one side of the circle to the other through the centre.



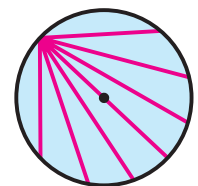
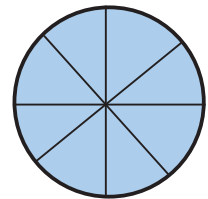
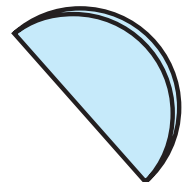
A straight line drawn from one point on the circle passing through the centre of the circle to the other point on the circle is called the diameter.

The length of the diameter is twice the length of the radius.



- 5** Let's fill in the blanks with correct words and numbers.

- 1 A diameter is times the radius.
- 2 If you fold a circle along its , there are two equal sections.
- 3 There are many diameters in a circle and all diameters have the length.
- 4 is the longest straight line between two points in the circle.

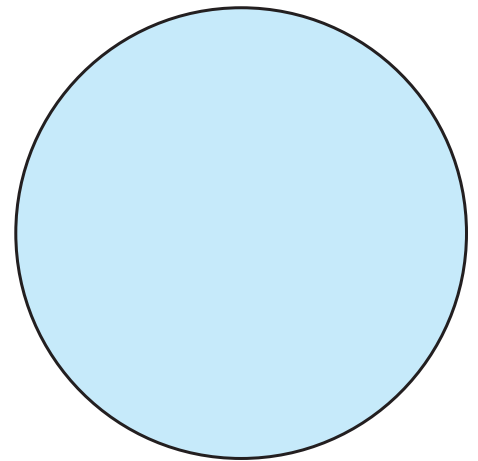


Exercise

Draw circles with the following diameters.

- 1 8 cm
- 2 12 cm
- 3 14 cm

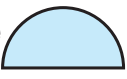
6 Draw a circle that is the same size as the circle on the right using a compass.



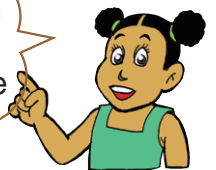
1 What do you need to have for drawing the circle?

2 How can you find the centre of the circle?



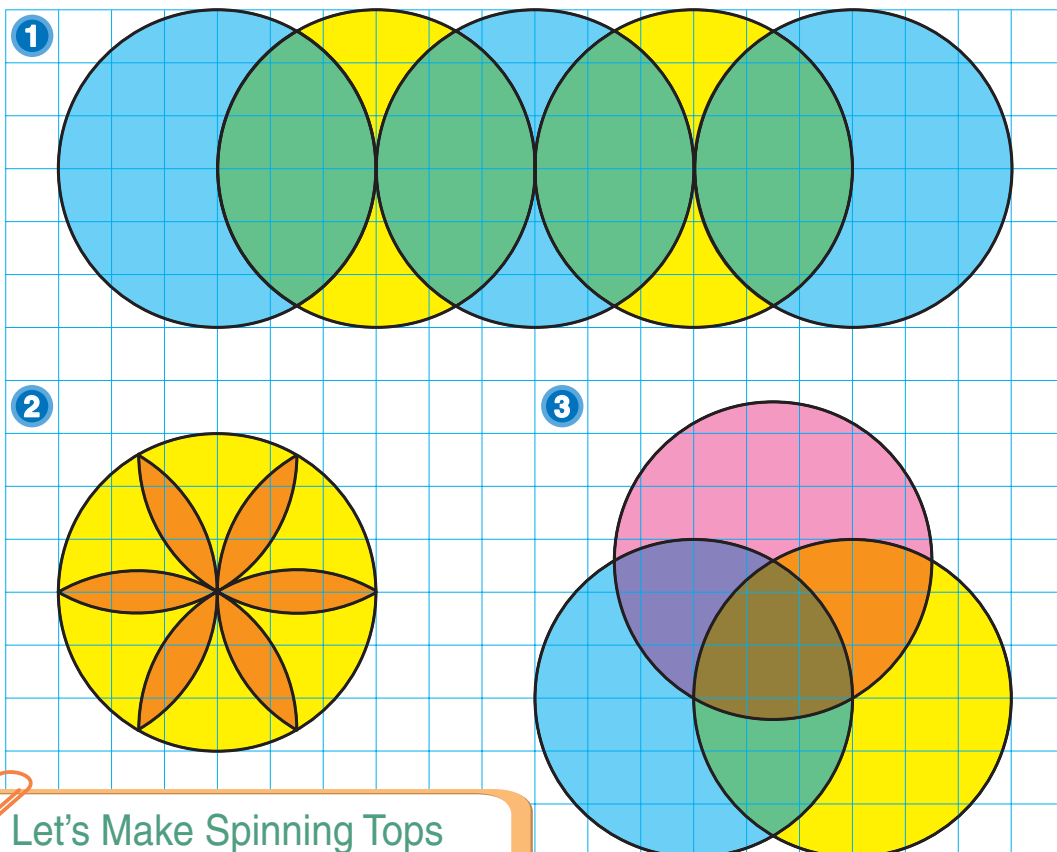
I will use a tracing paper and fold the circle into half. 

If we know the length of radius or diameter, we can determine the size of the circle.



Designing Patterns

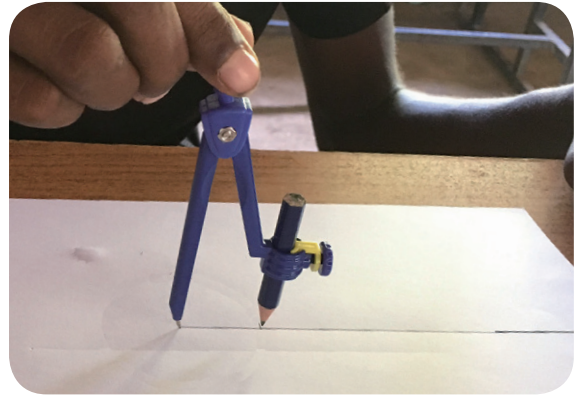
7 Let's draw different patterns and pictures using a compass.



Let's Make Spinning Tops

Functions of a Compass

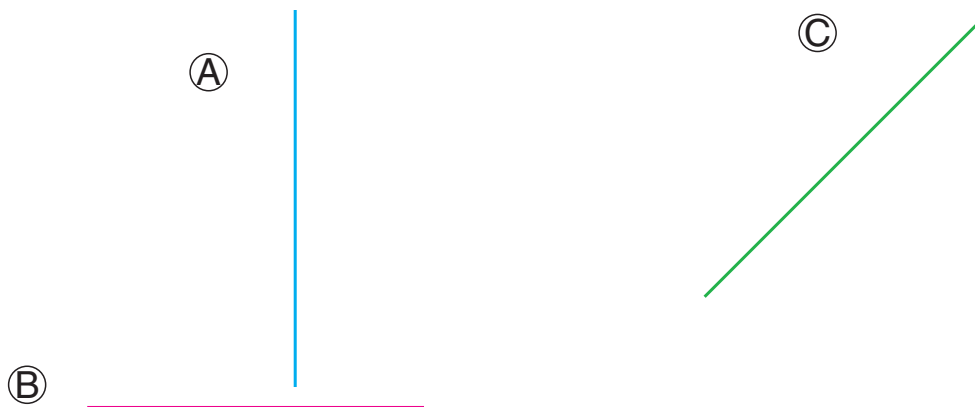
A compass can be used for other purposes other than drawing a circle.



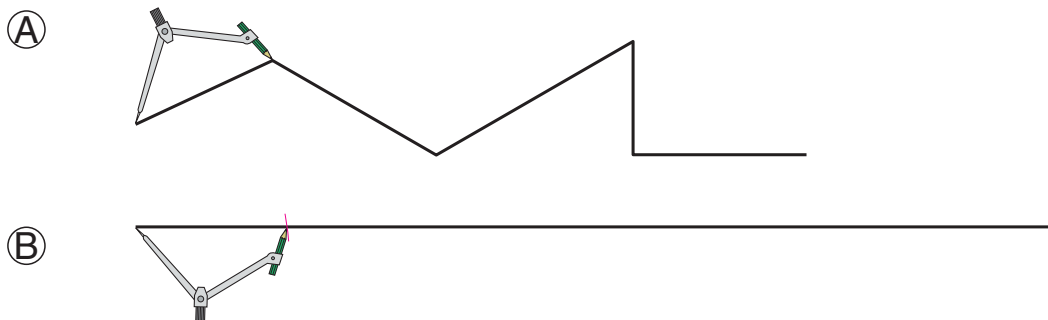
- ① You can divide a straight line into sections of the same length. Try making 3 cm sections on the line below.



- ② You can compare the lengths of (A), (B) and (C). Which of these straight lines is the longest?



- ③ You can transfer lengths. Transfer line (A) to line (B). How long is line (A) compared with line (B).



2 Spheres

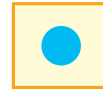
1 Explore the shape of a ball.

1 What is the shape of the ball when viewed from the above and the side?

2 Roll a ball.



From above



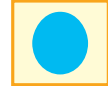
From above



From the side



From the side



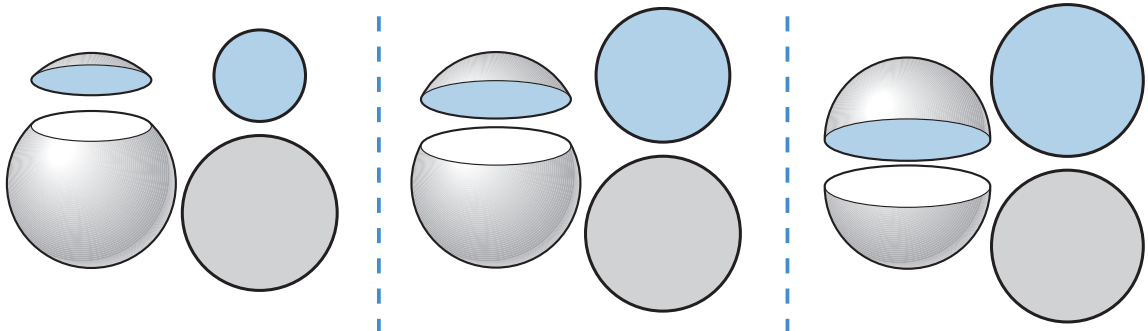
An object that looks like a circle from any direction is called a **sphere**.

3 Look for things shaped like a sphere.



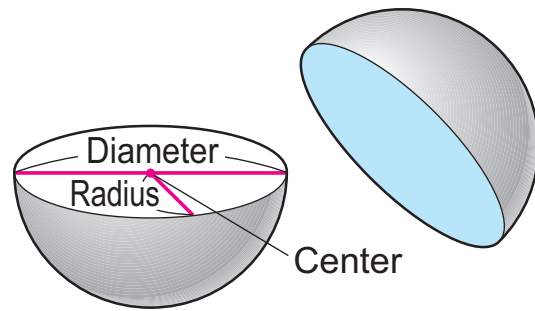
4 What is the shape of the cross-section of a sphere?

Where should we cut to make the largest cross-section from a sphere?

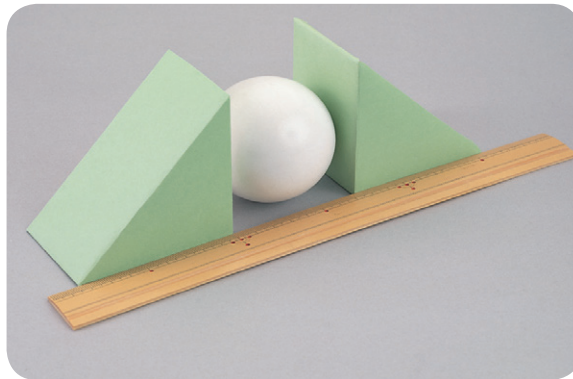




When a sphere is cut in half, the centre, the radius, and the diameter of the cross-sections are called the **centre, radius and diameter** of the sphere.



5 How can we find the diameter of a sphere?



Let's Find Circles and Spheres

Let's look for things shaped like circles and spheres.



Can you find the centre and the radius of these?



Floats for fishing net



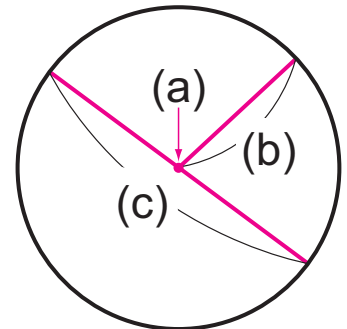


1 Answer these questions about the circle shown on the right.

Page 100



- ① What is point (a) called?
- ② What is the name given to the straight lines (b) and (c) ?



2 Write the correct words or numbers in the .

Page 102



- ① A straight line through the centre between 2 points on a circle is called .
- ② The length of a diameter is times the radius.

3 Draw the following circles.

Pages 101, 104



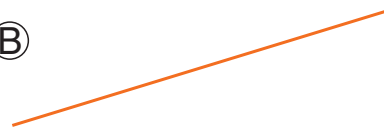
- ① A circle with a diameter of 4 cm.
- ② A circle with a radius of 4 cm.

4 Compare the lengths of the following straight lines.

Ⓐ



Ⓑ



Ⓒ



Let's fill in the boxes.

Grade 2

Do you remember?

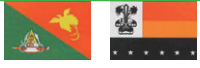


① 10 mm = cm

② cm = 1 m

③ 1dL = mL

④ 2000 mL = L



P r o b l e m s



1 Draw the following circles.

● Drawing circles with a given radius or diameter.

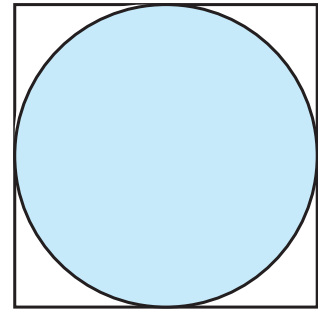
① A circle with a 6 cm radius.

② A circle with a 10 cm diameter.

2 A circle is put in a square of the same size as shown on the right.

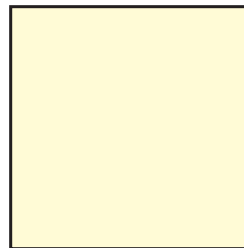
Find its radius and draw another circle of the same size.

● Understanding the properties of a diameter.



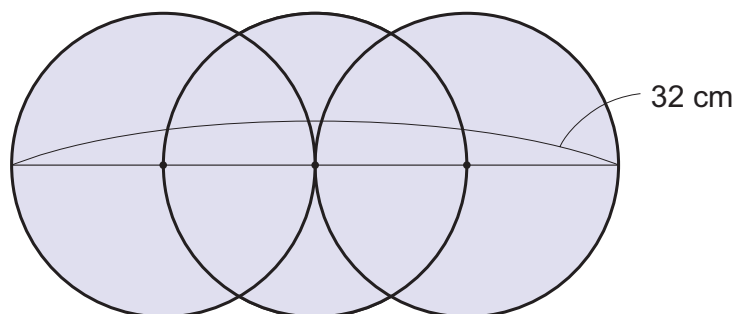
3 Which is longer around its edges, the rectangle or the square? Find the answer by using a compass.

● Understanding how to compare the lengths of lines by using a compass.

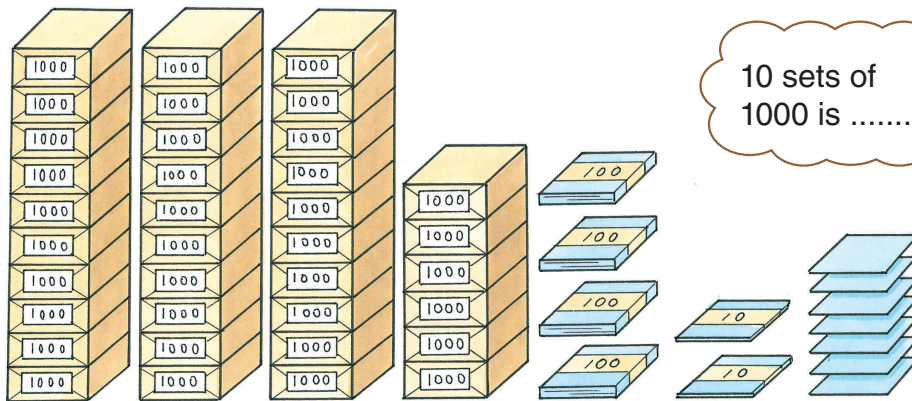


4 There are 3 circles of the same size below. Find the diameter of one of these circles.

● Understanding the radius and diameter of combined circles.



Large Numbers



1 Ten and Hundred Thousand Place

1 How many sheets of paper are there in the above figure?

1 If we make bundles of ten thousand, how many can we make?



3 sets of ten thousand is written as 30000 and is read as **thirty thousand**. It is also written as 30 **thousand**.

2 How many sheets of paper are there altogether?



Three ten thousand, six thousand, four hundred, two ten, and seven ones makes 36427 and it is read as thirty six thousand, four hundred and twenty seven.

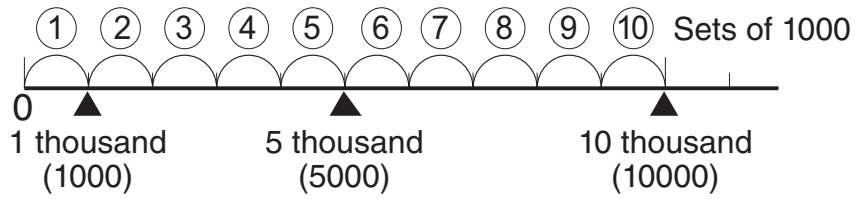
3	0	0	0	0
	6	0	0	0
		4	0	0
			2	0
				7
Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place



Let's find the structure of numbers larger than 10 000 and how to express them.



The number that is 10 sets of one thousand (1000) is written as **10000 or 10 thousand** and is read as ten thousand.



2 Write the following numbers in numerals while being careful about their place values.

- ① The number that is two sets of ten thousand, four sets of thousand, nine sets of hundred, a set of ten and eight ones.
- ② The number that is the sum of seven sets of ten thousand and 860.
- ③ The number that is the sum of eight sets of ten thousand and nine sets of ten.
- ④ The number that is four sets of ten thousand.

	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
①					
②					
③					
④					

Exercise

1 Read the following numbers.

- ① 48219 ② 98056 ③ 28000 ④ 70006

2 Write the following numbers in numerals.

- ① Eighty six thousand two hundred and fifty nine
- ② Fifty thousand and thirty two
- ③ Twenty thousand and eight hundred

3 Write the following numbers in numerals.

- ① The number that is the sum of three sets of ten thousand, nine sets of thousand and five sets of ten.

3 In 2011, Papua New Guinea census statistic showed that the number of male living in Eastern Highlands Province was 311000. Let's think about this number.

Ten thousand		1	0	0	0	0
10 sets of ten thousand make a hundred thousand	1	0	0	0	0	0



Hundred thousands place	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
3	1	1	0	0	0

- How many sets of the hundred thousand, ten thousand and thousand are combined to make this number?
- Read the number 311000.

4 Let's read the number of people in the Highlands Region in 2011 below.

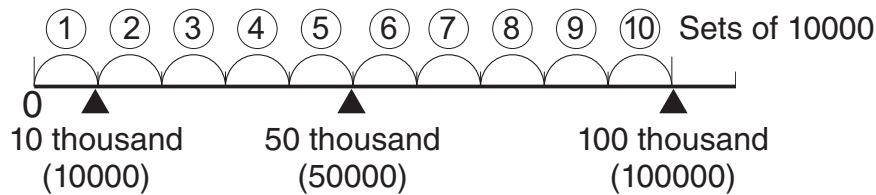
- Southern Highlands Province: 510245
- Western Highlands Province: 249449
- Enga Province: 432045
- Hela Province: 249449
- Jiwaka Province: 343987
- Simbu Province: 376473



5 Let's make the largest number and the second smallest number by arranging the number cards from 1 to 6.



The number that is 10 sets of ten thousand (10000) is written as **100000** or **100 thousand** and is read as **hundred thousand**.



Exercise

1 Read the following numbers.

- ① The number of babies born in Papua New Guinea in 2012 was 210181.
- ② The number of Papua New Guinea small holder coffee producers in 2008 was 397772.

2 Write the following numbers in numerals.

- ① The population of Lae city in 2000 was one hundred and nineteen thousand, one hundred and seventy four.
- ② The number of people living with HIV in Papua New Guinea in 2015 was two hundred, ten thousand, eight hundred and eleven.



How to Read and Write Large Numbers

Read after separating the third and fourth place by counting from the ones place. The number is read as Four hundred and sixty eight thousand, one hundred and forty nine.

468 149

For every 3-digit numbers, we include a space or comma.

Examples: ① Include **space** 468 149

② include **comma** 468, 149

2 The Structure of Large Numbers

1 Write the following numbers in numerals and read them.

1 The number that is the sum of 3 sets of ten thousand, 7 sets of thousand and 1 hundred.

2 The number that is the sum of 361 sets of thousand and 480.

3 The number that is the sum of 7 sets of a hundred thousand and 9 sets of a hundred.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
1						
2						
3						

2 Let's think about 245 000.

1 How many sets of hundred thousand, ten thousand and thousand are there in this number?

2 How many sets of 1000 are there to make this number?

3 How many sets of 100 are there to make this number?

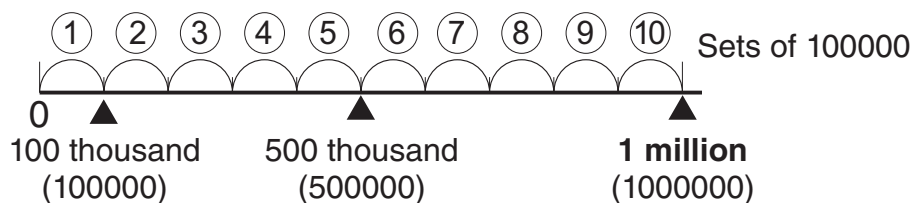


245 000 is also written as 245 thousand.

3 How many sets of hundred thousands are there to make 1000000?



The number that is 10 sets of hundred thousand is written as 1000000 and read as **one million**.



 **Exercise**

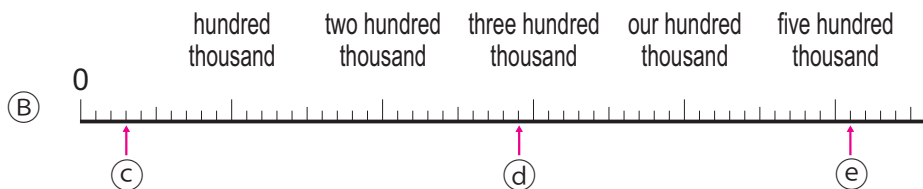
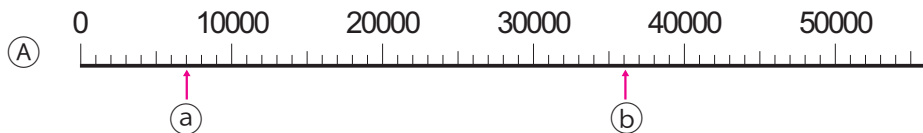
Write the following numbers and read them.

- ① The number that is the sum of 3 sets of ten thousand and 8 sets of thousand.
- ② The number that is the sum of 5 sets of hundred thousand, 2 sets of ten thousand and 9 sets of hundred.

4 Let's think about the following number lines.

What is expressed by each scale?

Which numbers are expressed by (a), (b), (c), (d) and (e) ?



A straight line, with marked points that are equally spaced in every point on the line corresponds to a number, is called a **number line**.

On the number line, the number gets larger as you move towards the right.

- 5** Draw the number line with a (unit) Scale of 10 thousand, marked with ↑ on the line corresponding to the following numbers.

180 thousand 250 thousand 320 thousand



- 6** Fill in the with a number.

① 99998 — 99999 — — — 100002

② 750 thousand — 800 thousand — ----
 ---- 900 thousand —

- 7** Arrange the following numbers in descending order and line them vertically in the table on the right.

- ① 386 020 ② 378 916 ③ 89 000

Compare the largest place numbers.



Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
①					
②					
③					

- 8** Show the relationship between the two numbers using $>$, $<$ and $=$.

45000 140000



The symbols $<$ and $>$ are called **inequality signs**. These symbols are used to compare two numbers, whether one number is larger or smaller than the another number.

 **Exercise**

1 Fill in the with a number.

① 99900 — 99950 — — 100050

② 528 thousand — — 532 thousand ----
---- — 536 thousand — 538 thousand

2 Arrange the following numbers in ascending order.

① (30001, 190000, 210003, 99900)

② (400000, 94000, 170000, 240000)

3 Fill in the with a sign of inequality.

① 54300 64100 ② 17300 17030

4 Fill in the with a number.

① 99900 — 99850 — — — 99700

② 648 thousand — — 642 thousand ----
---- — 636 thousand — 633 thousand

5 Arrange the following numbers in ascending order.

① (200000, 190000, 215000, 190050)

② (400000, 500000, 40000, 3000)

6 Fill in the with the signs of inequality.

① 24900 25900 ② 39000 38000

3

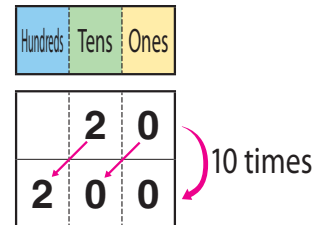
10 Times, 100 Times and Divided by 10

1 You buy tinned meat which costs 20 kina each. How much for 10 tinned meat?

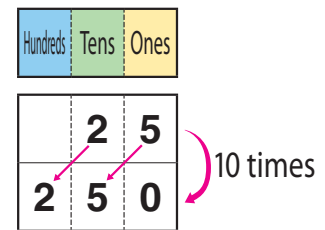
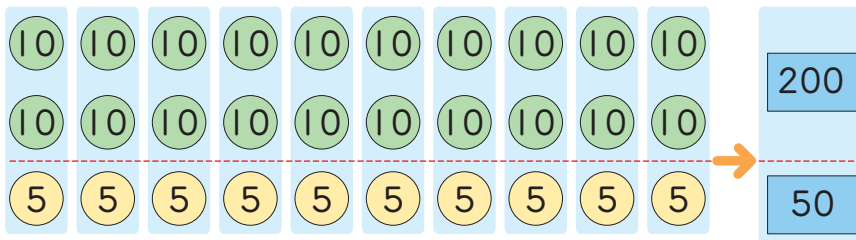
10 tinned meat and 10 times have the same meaning!



$$20 \times 10 = \boxed{}$$

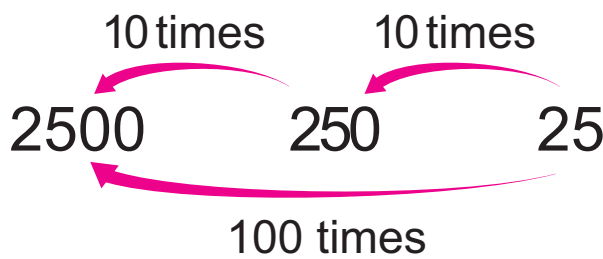


2 What is 10 times 25?

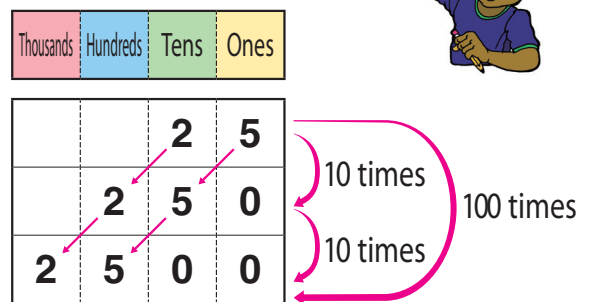


3 What is 100 times 25?

Compare the largest place digits.



$$25 \times 100 = \boxed{} ?$$



When any number is multiplied by 10, each digit of that number moves to the next higher place and then 0 is added at the end. Also, when any number is multiplied by 100, each digit of that number moves 2 places up and then 00 is added at the end.

4 What is 150 divided by 10?

$150 \div 10 = \square$



If any number with a 0 in the ones place is divided by 10, each digit of that number moves to the next lower place and 0 in the ones place disappear.

5 Let's make 10 times 35. Then divide the answer by 10.

6 Multiply 48 by 100. Then divide the number by 10.



The answer is the same number as 10 times 48.

Exercise

Multiply the following numbers by 10 and 100, then divide them by 10.

- ① 70
- ② 500
- ③ 640
- ④ 850

4 Addition and Subtraction


1 Let's add $7356 + 8421$ in vertical form.

	7	3	5	6
+	8	4	2	1


In the thousands place, the answer is carried up, so how should we write?



2 Let's use cards with numbers $1, 2, 3, 4, 5, 6, 7$ and 8 , for making addition and subtraction problems of 4-digit numbers.

 **Naiko's problem**

	6	1	4	5
+	7	3	2	8

 **Ambai's problem**

	4	8	1	2
-	3	5	7	6

1 Let's make an addition problem that has the largest answer.



In which case does the answer become largest?

It is largest when both thousands place are the largest!



2 Let's make a subtraction problem that has the smallest answer.

3 In 2011, the number of people in West Sepik Province was 248000. The number of people in East Sepik Province was 450000. How many people are there in the provinces of West and East Sepik altogether?

1 Write an expression.

+

248000 is written as 248 thousand.



2 Let's think about how to calculate.

3 What is the difference in the number of people between the West Sepik Province and East Sepik Province?

-

Assume 1 thousand people as one set, and then calculate. It is better to calculate by estimating sets of one thousand.



 **Exercise**

① 4760 + 7071

② 5634 + 6509

③ 8693 - 3587

④ 8606 - 8198

⑤ 210000 + 370000

⑥ 530000 - 180000

4 Let's add 187653 + 972784 in vertical form.

We use the same method even if there are more digits!



	1	8	7	6	5	3
+	9	7	2	7	8	4
<hr/>						



This one calculation is the result of the following calculations.

3	5	6
+ 4	+ 8	+ 7
<hr/>	<hr/>	<hr/>
7	8	1
+ 2	+ 7	+ 9



1 Write the following numbers in numerals, and read them.

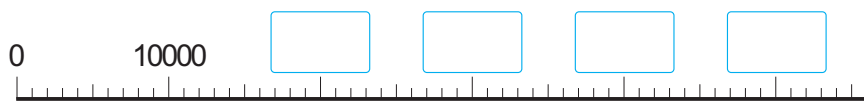
● Understanding the structure of large numbers and how to read them.

- ① The number that is the sum of 48 sets of ten thousand and 270.
- ② The number that is the sum of 5 sets of hundred thousand, 9 set of thousand and 2 sets of hundred.
- ③ The number that is the sum of 2 sets of hundred thousand, 35 sets of thousand.
- ④ The number that is 10 sets of hundred thousand.

2 Draw an arrow to the number line that corresponds to the numbers.

● Represent numbers on the number line.

- ① 2000 ② 18000 ③ 30000 ④ 45000



3 Fill in the with an appropriate number.

● Understanding how to arrange numbers in order.

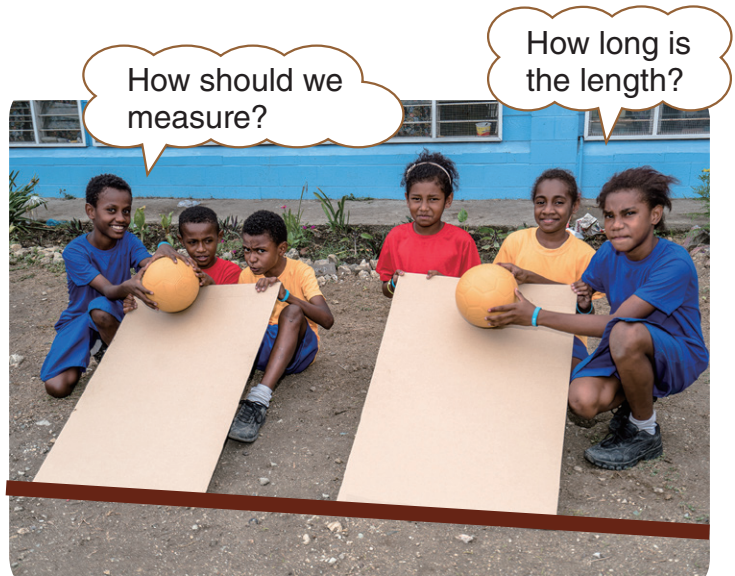
- ① 19850 — — 19950 — 20000
- ② 19800 — 19900 — — 20100
- ③ 250 thousand — — — 100 thousand — 50 thousand

Length

▶▶ Let's roll the balls using a cardboard!



▶▶ Investigate how far balls can move. How should we measure the length?



The length is approximately 5 times of a 1 m ruler (stick).



Let's investigate how to measure a longer length.



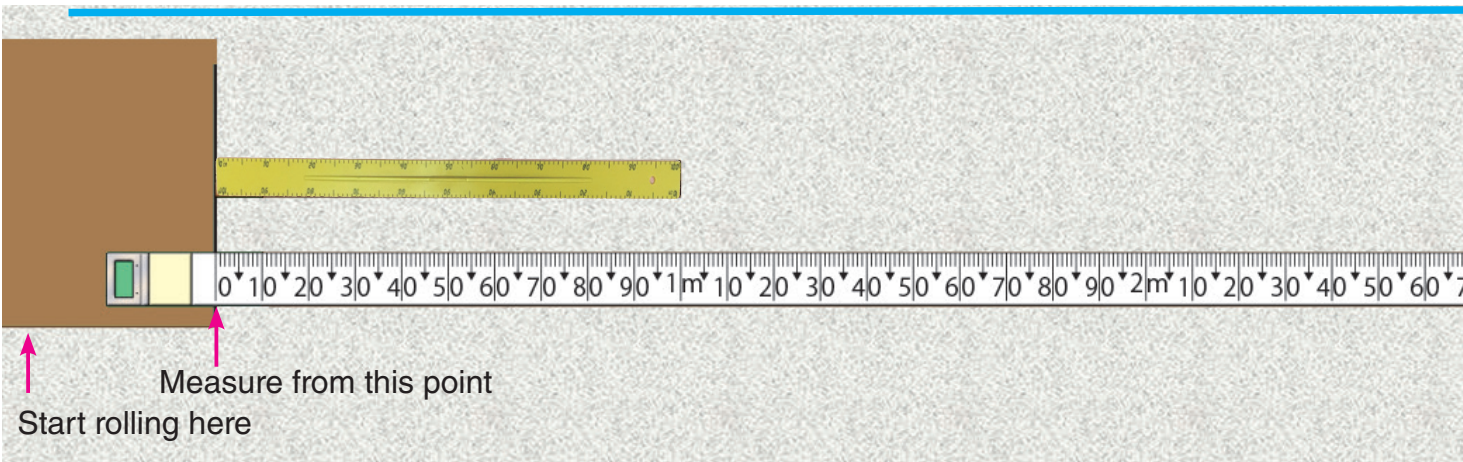
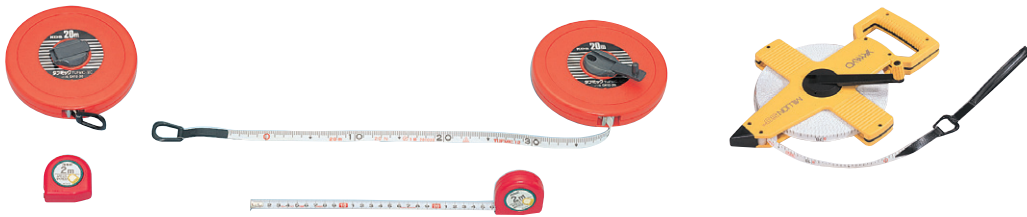


It is difficult to make a line for measuring by using a 1 metre ruler.



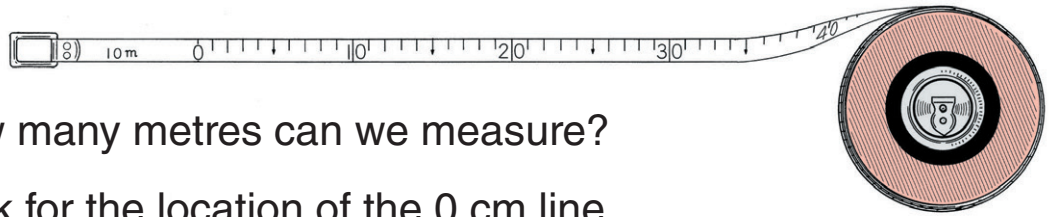
The length between 2 places along a straight line is called **distance**.

A tape measure is good to measure the run distance.



1 How to Measure

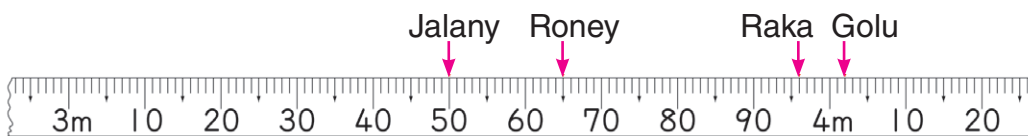
1 Let's investigate how to use a tape measure.



- 1 How many metres can we measure?
- 2 Look for the location of the 0 cm line.
- 3 Jalany and three other children

rolled balls.

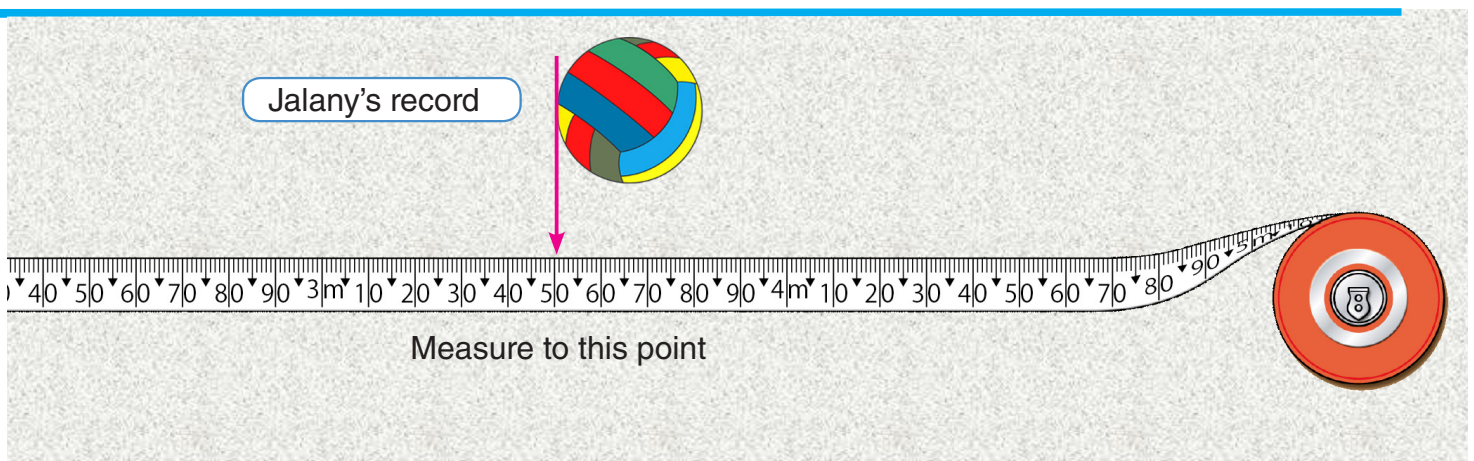
Write the distances in which her friend's ball moved in the table below.



Distance that each ball rolled

Name	Jalany	Roney	Raka	Golu
Distance moved				

4 Arua's ball rolled 4 m 18 cm. Write an ↓ on the tape measure above.

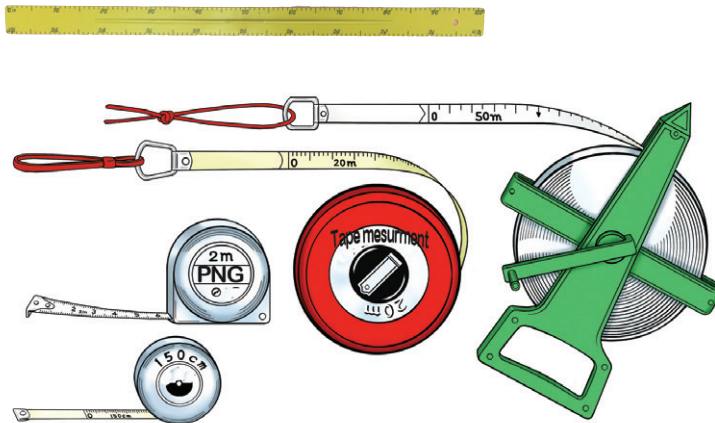


2 How can you estimate the length of 10 metres?

Walk to a point that you think is 10 metres away. Then, measure the real distance.



3 What can we use to measure with the following things?



- 1** The length and width of a book
- 2** The length and width of a desk
- 3** The length and width of a blackboard
- 4** The height of a desk
- 5** The circumference of a can
- 6** The length of a classroom

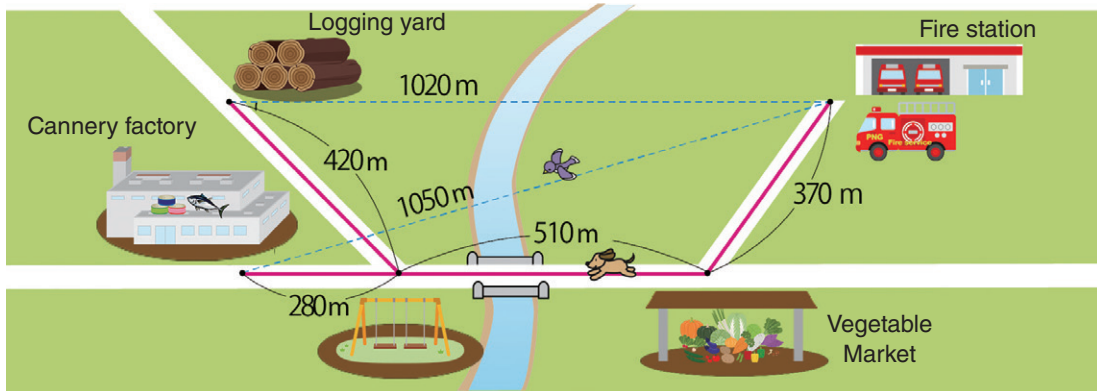
4 Let's measure various things and find better ways.



2

Kilometre

1 Look at the map below and solve the following problems.



The length measured along the road is called **road distance**.

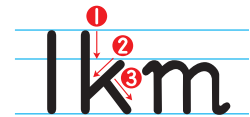
1 How long is the road distance and the distance from the fire station to the Tuna cannery factory in metres, respectively?

Distance is the length measured in a straight line.



1000 m is called one kilometre and is written as 1 km.

$$1 \text{ km} = 1000 \text{ m}$$



2 How many kilometres and metres are the road distance and the distance from fire station to Tuna cannery factory respectively?

Road distance $1160 \text{ m} = \square \text{ km } \square \text{ m}$

Distance $1050 \text{ m} = \square \text{ km } \square \text{ m}$

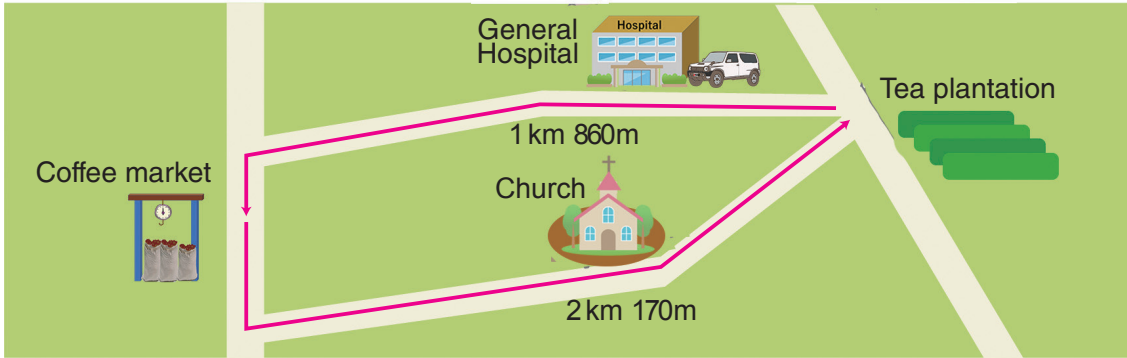
km				m
	1	1	6	0
	1	0	5	0

1 km 160 m is called "one kilometre and one hundred sixty metres".



3 How many kilometres and metres are the road distance and the distance from the fire station to logging yard, respectively?

2 Look at the map below and solve the following problems.



Students from Blue class visited town for the excursion.
Move from tea plantation to coffee market.

1 How many kilometres and metres is the road distance from the tea plantation to the coffee market through the General hospital and return from the coffee market to the tea plantation through the church? Write an expression.

1 km 860 m 2 km 170 m

Let's think about how to calculate.



Mero's idea

Kilometre
 $1 \text{ km} + 2 \text{ km} = 3 \text{ km}$
 Metre
 $860 \text{ m} + 170 \text{ m} = 1030 \text{ m}$
 $1030 \text{ m} = 1 \text{ km } 30 \text{ m}$
 Total, 4 km 30 m



Yamo's idea

$1 \text{ km } 860 \text{ m} = 1860 \text{ m}$
 $2 \text{ km } 170 \text{ m} = 2170 \text{ m}$
 So,
 $1860 \text{ m} + 2170 \text{ m} = 4030 \text{ m}$
 $4030 \text{ m} = 4 \text{ km } 30 \text{ m}$

2 Between the tea plantation and the coffee market, which road distance is longer and by how many more?

Calculate the Length in Vertical Form

	km			m
	2	1	7	0
	-	1	8	6

3 Let's explore the distance of 1 km around the sport field.

1 Walk for 100 m and think about how far is 1 km.

- How many of your steps did you take to walk 100 m?
- How many steps for 1 km?

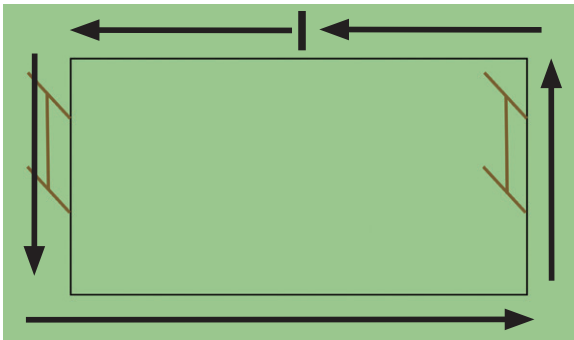


How many steps for 100 m?
How many steps for 1 km?



2 Let's walk 1 km.

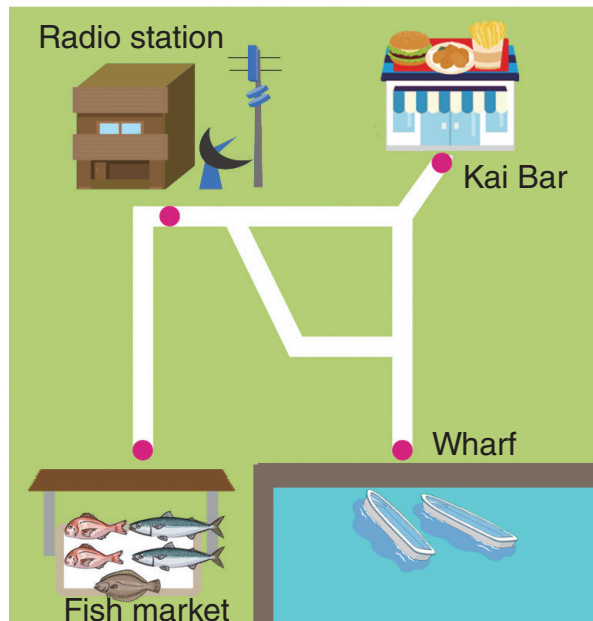
- How many minutes does it take?
- How do you feel?



3 Let's relate the distance of 1 km in our environment.

Travelling by bicycle

- 4 Tanya is touring a sea side town by bicycle. She departs from the Kai Bar, visits both the Radio station and the Wharf and finally arrives at the fish market.



Road Distance and Time

	Road distance	Time
Kai bar ↔ Radio station	2 km 400 m	16 minutes
Kai bar ↔ Wharf	6 km 100 m	28 minutes
Radio station ↔ Wharf	6 km 200 m	31 minutes
Radio station ↔ Fish market	19 km 100 m	48 minutes

- The table above shows the road distance and travel time between 2 places. Which is better to go first, is it the Radio station or the Wharf?
- Which is the longest road distance, is it when she goes to the Radio station first or the wharf, and by how many?
- Which takes a longer time by bicycle, and by how long?

1 Let's fill in the with a number or a word.

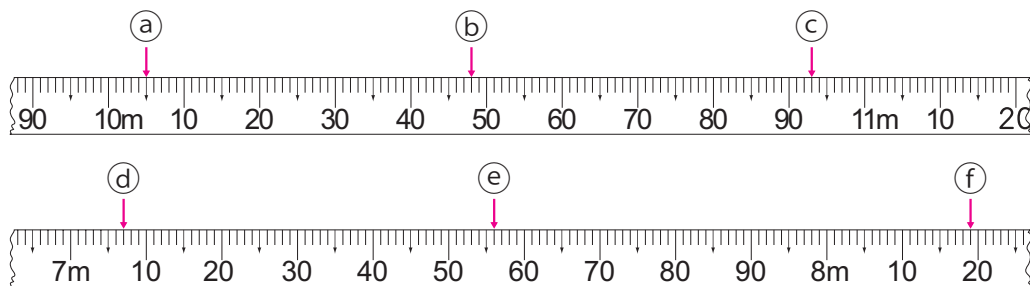
Pages 124, 127



- ① Choose 2 places and measure the length in a straight line.
This is called .
- ② The distance measured along the road is called .
- ③ 1 km = m

2 How many metres and centimetres are shown by the arrows ↓ on the tape measures shown below.

Page 125

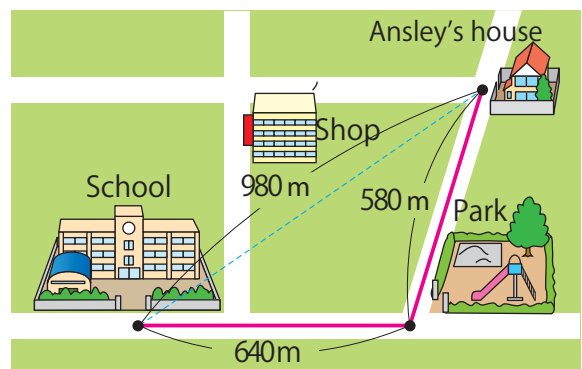


3 The map below shows the road distance and the distance between Ansley's house and the school.

Page 130



- ① How many kilometres and metres is the road distance from Ansley's house to the school through the park?
- ② What is the difference in metres between the road distance ① and the distance from Ansley's house to the school?



Let's find time and duration.

Grade 3

Do you remember?



- ① What time is 45 minutes after 10:40 in the morning?
- ② What is the duration from 11 hours and 30 minutes in the morning to 1 hour and 30 minutes in the afternoon?

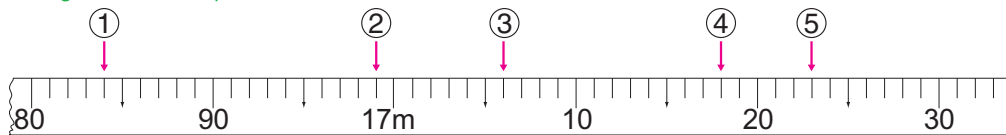
1 Fill in the with a correct unit.

● Using units of length correctly.

- ① The length of the classroom is 8 .
- ② The road distance that we walk in one hour is 4 .
- ③ The height of the desk is 60 .
- ④ The height of Mt. Wilhelm is 4509 .

2 How many metres and centimetres are there at the arrows ↓ on the tape measure?

● Reading the scale of a tape measure.



3 Which is longer?

● Understanding relationship between different units of length.

- ① 2 km 50 m ; 2030 m ② 1580 m ; 1 km 59 m
- ③ 5 km ; 4980 m

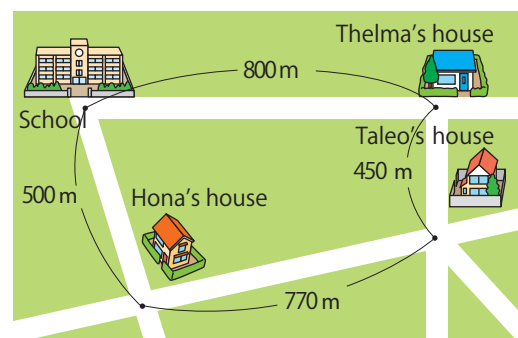
4 Let's calculate.

● Specify in meter / km and meter.

- | | |
|----------------------|----------------------|
| ① 700 m + 500 m | ② 1 km 900 m + 200 m |
| ③ 5 km 400 m + 680 m | ④ 1 km - 300 m |
| ⑤ 2 km 500 m - 800 m | ⑥ 3 km 530 m - 540 m |

5 Taleo can go to school through Thelma's house or Hona's house. Which of the 2 has the longest road distance? And by how much?

● Understanding the relationship of road distances from the map.



Triangles

Let's prepare making triangles!



Blue 6 cm

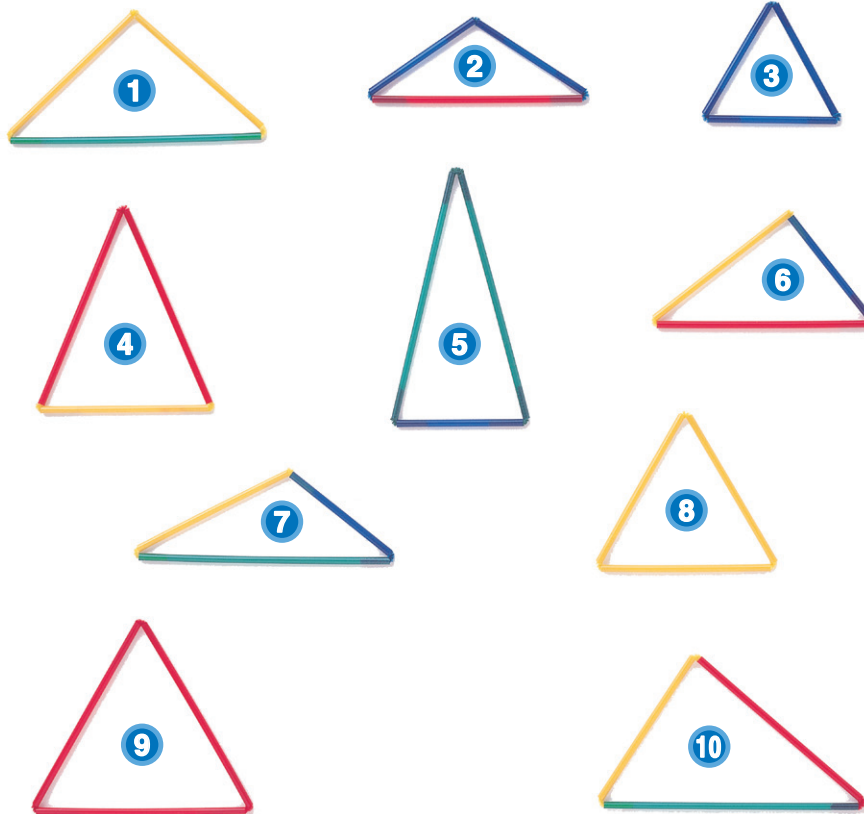
Yellow 8 cm

Red 10 cm

Green 12 cm



▶▶ Let's make triangles using straws of different lengths.



1 Isosceles and Equilateral Triangles

1 Group the same types of straw triangles.

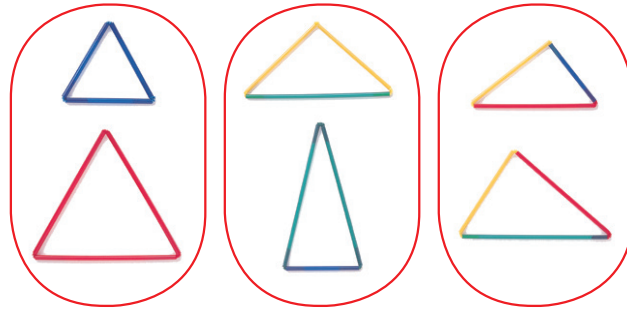


What are the differences?

There are 4 coloured straws.



Classify by the number of coloured straws.

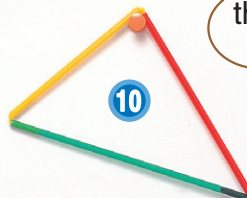
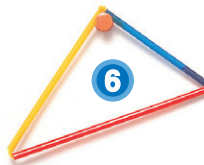
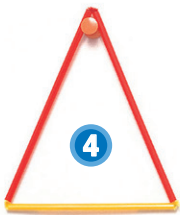


Let's pin triangles on the bulletin board.



Teacher

Some triangles are slanted and others have a horizontal base.



Can you find triangles that will change depending on the hanging point?



1 Let's classify triangles using Naiko and the teacher's methods.

Let's investigate various types of triangles and how to draw them.








Naiko's method

Trace, cut and paste triangles on the table below.



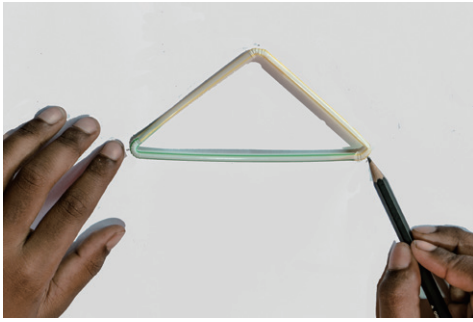
Ⓐ	Ⓑ	Ⓒ
Blue, Blue, Red 6 cm, 6 cm, 10 cm 	Blue, Blue, Blue 6 cm, 6 cm, 6 cm 	Yellow, Blue, Green 8 cm, 6 cm, 12 cm 
	The lengths of the 3 sides are equal.	

2 To classify triangles in Ⓐ, Ⓑ and Ⓒ, let's think about the lengths of the sides and write their properties in the bottom row.

The same colour shows the same length.



Trace triangles in (A) and measure the lengths of their sides.



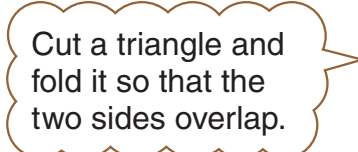
Draw a point at the vertex.



Draw a straight line connecting the 2 points.



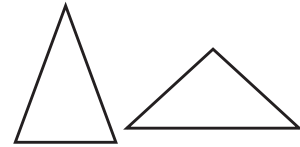
Measure the lengths of sides by a ruler.



Cut a triangle and fold it so that the two sides overlap.



A triangle with two equal sides is called an **isosceles triangle**.



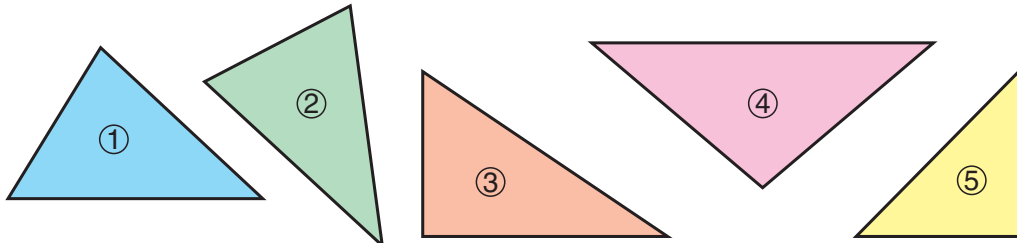
2

Let's look for isosceles triangles around us.

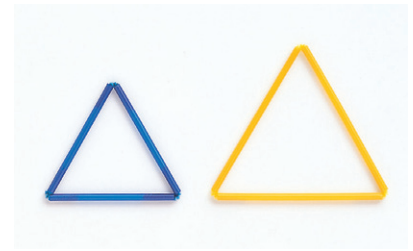


Exercise

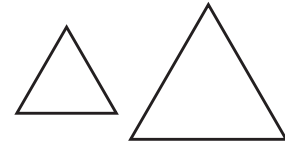
Which of these triangles are isosceles triangles?



3 Trace triangles in **B** on **1** and measure the lengths of their sides.



A triangle with three equal sides is called an **equilateral triangle**.



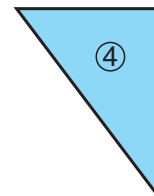
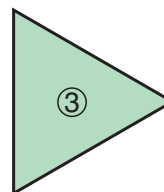
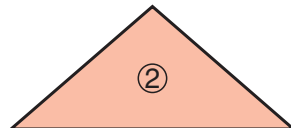
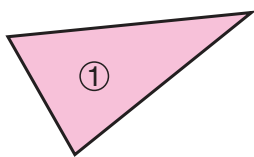
4 Let's look for equilateral triangles around you.



Triangle warning kit

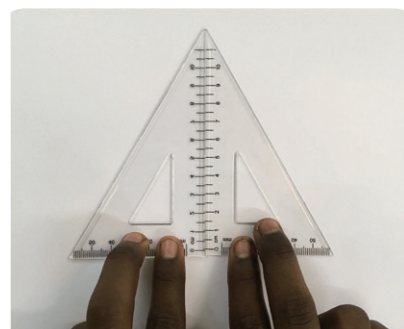


5 Which of these triangles are equilateral triangles?



 **Exercise**

Let's make an isosceles triangle and an equilateral triangle by using two same set-squares.

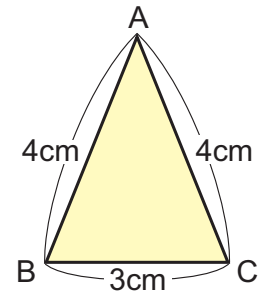


2

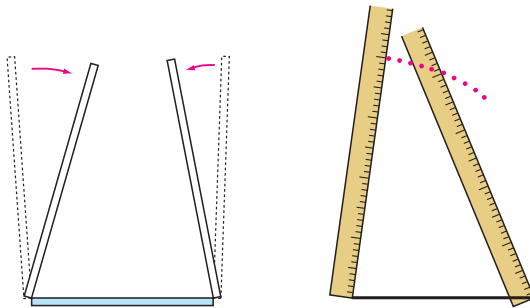
How to Draw Triangles

1 Let's think about how to draw an isosceles triangle where the sides are 3 cm, 4 cm and 4 cm.

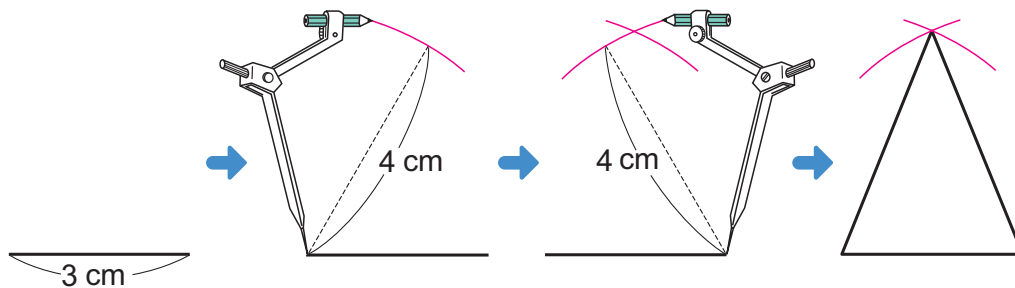
Draw the side BC.



1 Let's think about how to locate the vertex A from the drawing below.



2 Let's use a compass for drawing it.



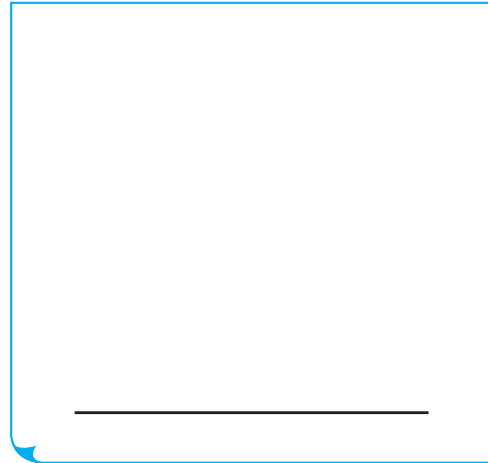
Exercise

Let's draw the following triangles.

- ① An isosceles triangle where the 3 sides are 4 cm, 6 cm and 6 cm
- ② An isosceles triangle where the 3 sides are 5 cm, 5 cm and 8 cm

2

One side of an equilateral triangle was drawn on the right. The length is 5 cm. Let's draw the other sides of the equilateral triangle. Also, explain how you drew it.



Can I draw it as I did for an isosceles triangle?

It is understandable to explain the reason using "first," "next," "moreover" and "finally."

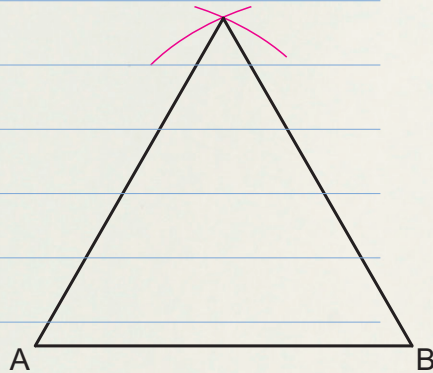


First, let the end points of a line be A and B.

Next, draw a part of circle with centre A and radius 5cm, using a compass.

Moreover, draw a part of circle with centre B and radius 5cm in the same way.

Finally, connect from the intersected point of the two circles to points A and B, respectively.



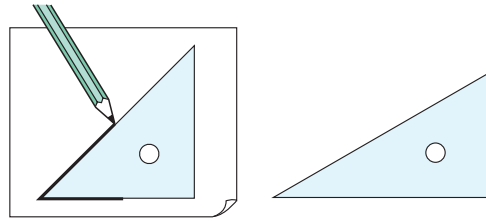
Exercise

Let's draw the following triangles.

- ① An equilateral triangle where all sides are 4 cm.
- ② An equilateral triangle where all sides are 7 cm.
- ③ An isosceles triangle where 3 sides are 8 cm, 8 cm and 6 cm.

3 Triangles and Angles

- 1 Trace each corner of the set-squares on the paper and investigate.



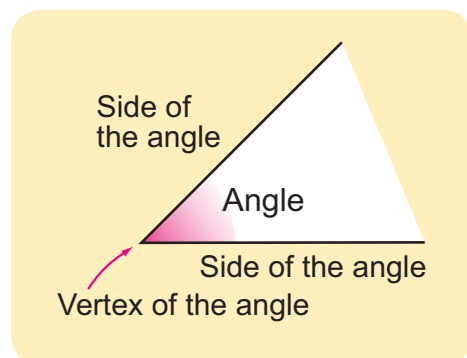
- 1 Which corner is a right angle?
- 2 Which corner is most acute?



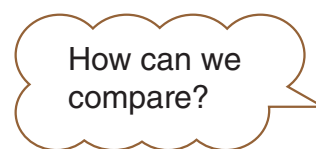
The figure formed by 2 straight lines from one point is called **angle**.

The point is called **vertex** of the angle and the 2 straight lines are called **sides** of the angle.

The amount of opening between both sides of an angle is called **size** of the angle.



- 2 Compare the sizes of the angles traced in 1 and say the order of the size of the angle.

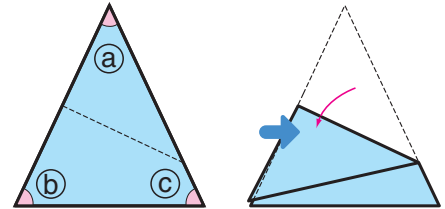
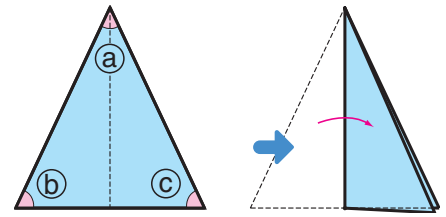


The size of an angle is determined by the amount of opening between sides and not the length of the side.

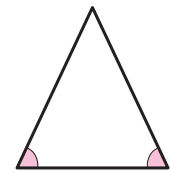
3 Let's draw an isosceles triangle on a sheet of paper and cut it.

1 Compare the sizes of angle (b) and (c).

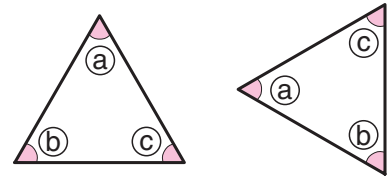
2 Compare the sizes of angle (a) and (b).



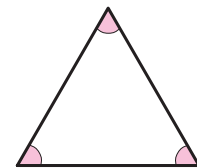
In an **isosceles triangle**, sizes of two angles are equal.



4 Let's draw an equilateral triangle on the paper and cut it, then compare the sizes of angles (b) and (c), and (a) and (b), respectively.

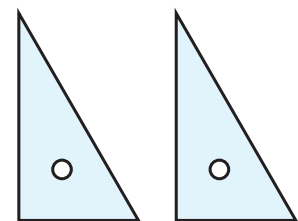


In an **equilateral triangle**, sizes of three angles are equal.



Exercise

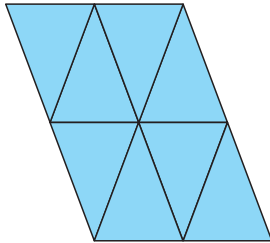
Can we make the following figures using the set-squares as shown on the right?
 rectangle, square, right triangle equilateral triangle, isosceles triangle



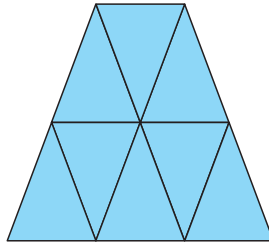
4 Designing Patterns

1 Let's make various shapes using the same isosceles triangles.

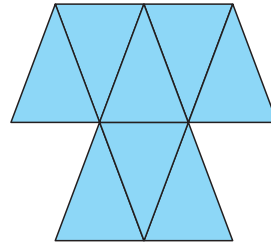
8 isosceles triangles



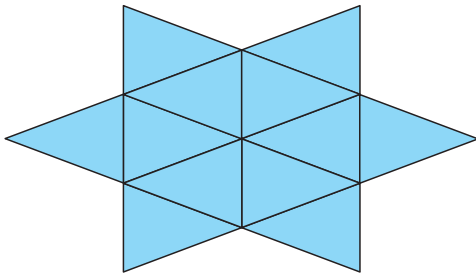
8 isosceles triangles



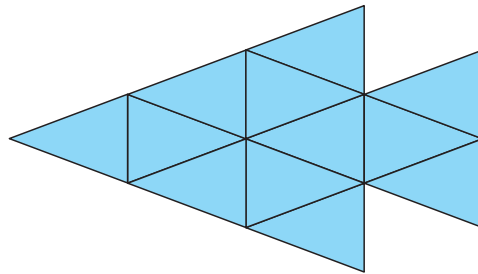
8 isosceles triangles



12 isosceles triangles

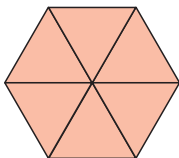


12 isosceles triangles

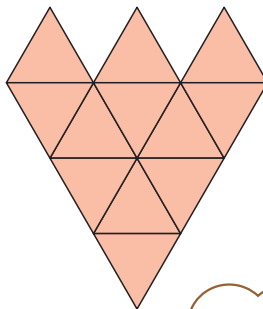


2 Let's make various shapes using the same equilateral triangles.

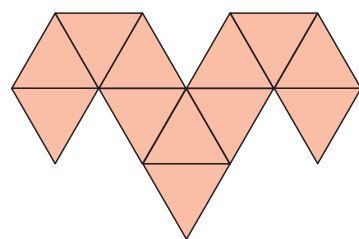
6 equilateral triangles



12 equilateral triangles



12 equilateral triangles



I made a larger equilateral triangle using small equilateral triangles.



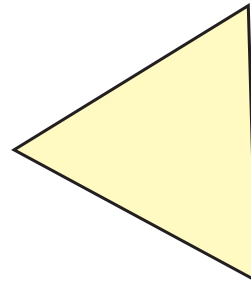
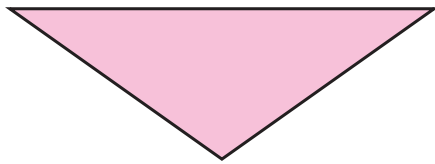
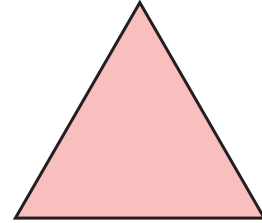
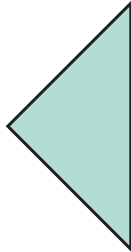
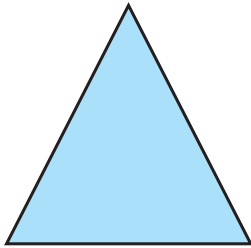
Let's look for interesting shapes with triangles around us.





1 What kinds of triangles are these?

Page 136

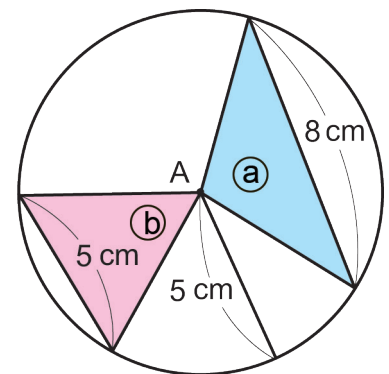


2 The radius of the circle on the right is 5 cm and its centre is point A.

Page 139



- ① What kind of triangle is triangle (a)?
- ② What kind of triangle is triangle (b)?



3 Let's draw the following triangles.

Pages 138 ~ 139



- ① An isosceles triangle where 3 sides are 7 cm, 5 cm and 5 cm.
- ② An equilateral triangle where all sides are 6 cm.

Multiply the following numbers by 10 and 100 and divide them by 10.

Grade 3

Do you remember?



- ① 20
- ② 400
- ③ 780
- ④ 910

1 Let's fill in the with a number.

● Understanding special triangles.

① An isosceles triangle has sides of the same length and angles of the same size.

② An equilateral triangle has sides of the same length and angles of the same size.

2 Let's draw the following triangles. And what kinds of triangles are these?

● Drawing triangles from given three sides.

① A triangle with sides of the lengths 6 cm, 4 cm and 4 cm.

② A triangle with all sides of length 5 cm.

①	②
---	---

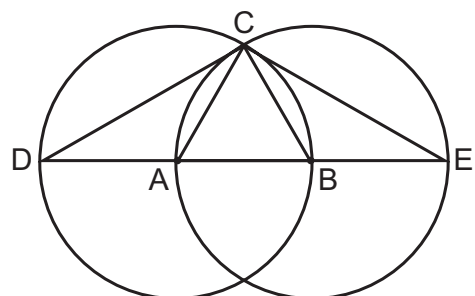
3 The radii of the 2 circles below are both 4 cm and their centres are A and B. BD and AE are diameter of each circle. Draw the same figure, and answer the following problems.

● Understanding properties of triangles and circle.

① Look for isosceles triangles.

If you do not know the length of the sides, measure its length.

② A triangle CAB is an equilateral triangle. Explain its reason.



Tables and Graphs

- ▶▶ The children in Morea's class investigated the kind of food eaten for breakfast last Sunday in Kerema town.



Is it better to just group them into biscuits and bread only?

There may be nothing to eat.



There are many possibilities.

Making the table, let's investigate it in order.



Let's think about how to arrange the data and represent it.

1

Tables

1 The tables below are records of the kind of food children in Morea's class ate for breakfast last Sunday.

Morea's Table

Sunday's Breakfast

Kind	Number of children
Biscuit	✓✓✓✓✓✓✓✓✓✓
Scone	✓✓✓✓✓✓✓✓✓✓
Bread	✓✓✓✓
Others	✓✓✓✓✓✓
Total	

Maia's Table

Sunday's Breakfast

Kind	Number of children
Biscuit	≡≡≡ ≡≡≡
Scone	≡≡≡ ≡≡≡
Bread	
Others	≡≡≡
Total	

1 Let's change the number of "✓" and the tally "≡≡≡" to numbers.

| ... 1 || ... 2 ||| ... 3 |||| ... 4 ≡≡≡ ... 5

- 2 Discuss the different ways how the 2 children made their tables.
- 3 What kind of food is eaten the most and by how many children?
- 4 Write the total number of children surveyed.



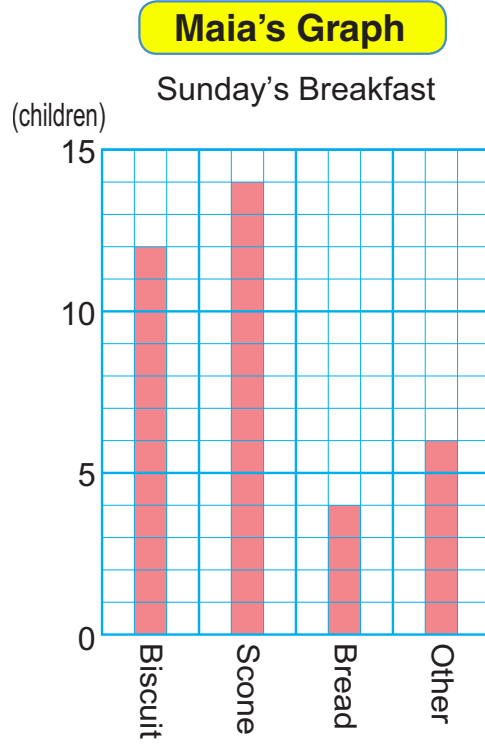
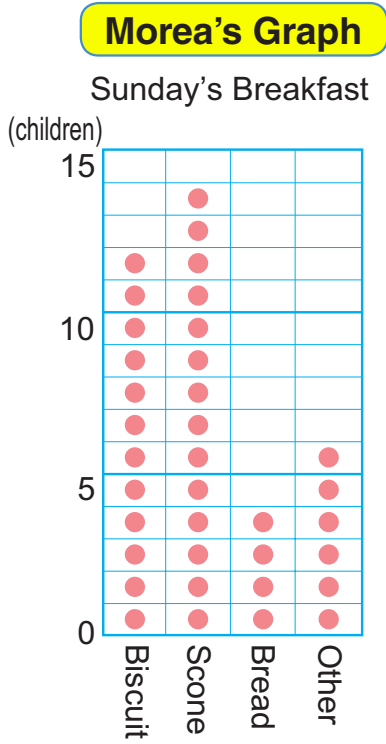
Various Counting Methods

When we count the number of things, we use the signs ≡≡≡ and ✓.

2

Bar Graphs

1 Morea and Maia made the following graphs from the tables in the previous page.



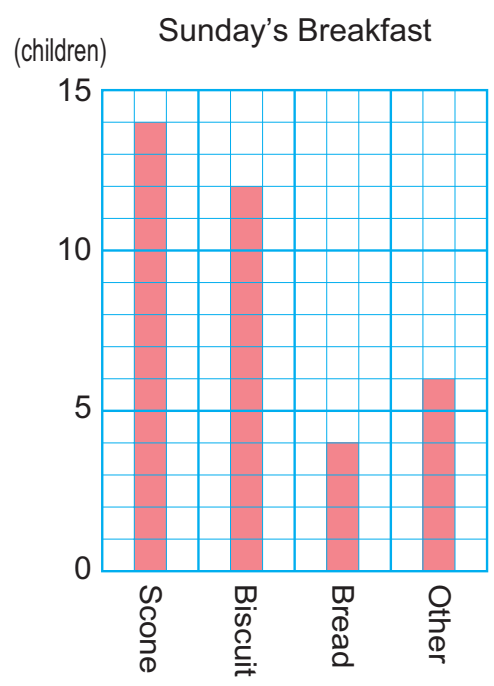
- 1 How did they represent the number of children?
- 2 Let's discuss the differences between Morea's graph and Maia's graph.
- 3 Compare the tables in the previous page with the graphs above. Which one makes it the easiest to compare the number of children? Which one makes it the easiest to see the number of children?



A graph which represents the various amounts by the length of bars is called **bar graph**.

2 Keni changed Maia's graph into this one on the right.

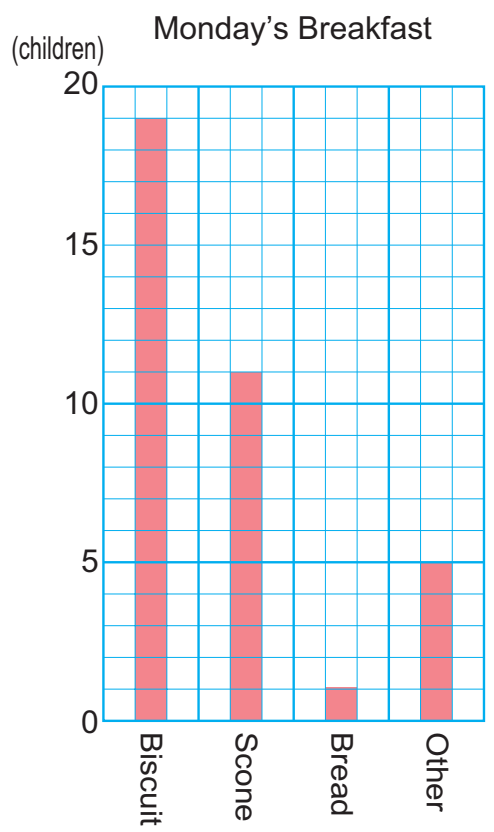
- 1** How many students ate biscuit, scone, bread and others, respectively?
- 2** Which kind of food has the largest number of children?
- 3** Let's discuss about Keni's graph and how it is different from Maia's graph.



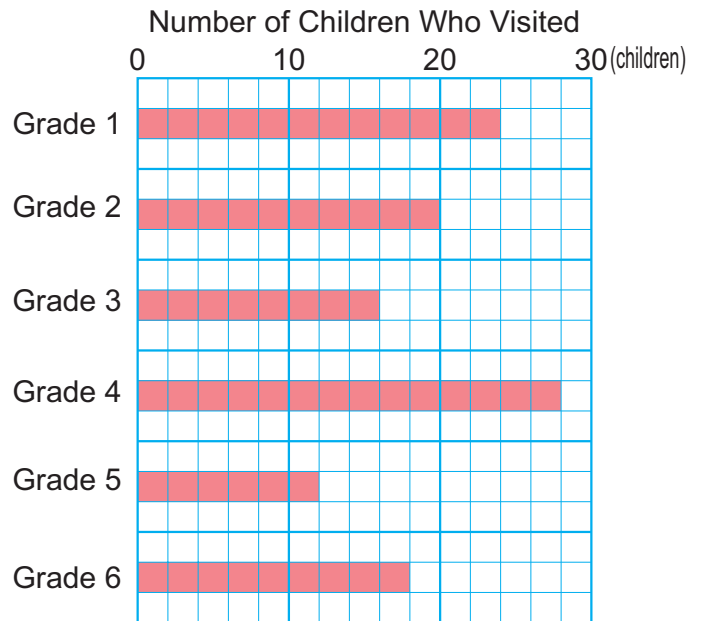
In the bar graph, the bars are usually drawn in order from longest to shortest. The "other" bar is usually drawn last.

3 This bar graph shows the number of children and the type of food children ate last Monday.

- 1** How is this different from the graph for last Sunday?



4 Dorah's group recorded the number of children who visited the school nurse. They recorded the number of children in each grade and made a bar graph.



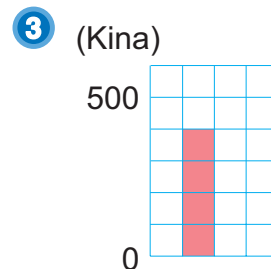
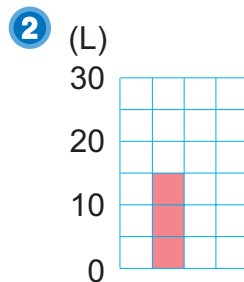
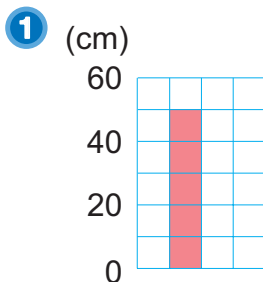
- How many children are in 1 scale unit of the bar graph?
- Let's read the number of children who visited school nurse in each grade.
- What can we conclude from this bar graph?

You can make a bar graph for large numbers by increasing the number that each scale in the graph represent.



When a bar graph shows amounts with given order like grades, the bars are drawn in that order.

5 In the graphs below, let's read how much is each unit.



How to Draw a Bar Graph

6 The table on the right shows the favourite sports of 3rd grade children in class one. Let's draw a bar graph.

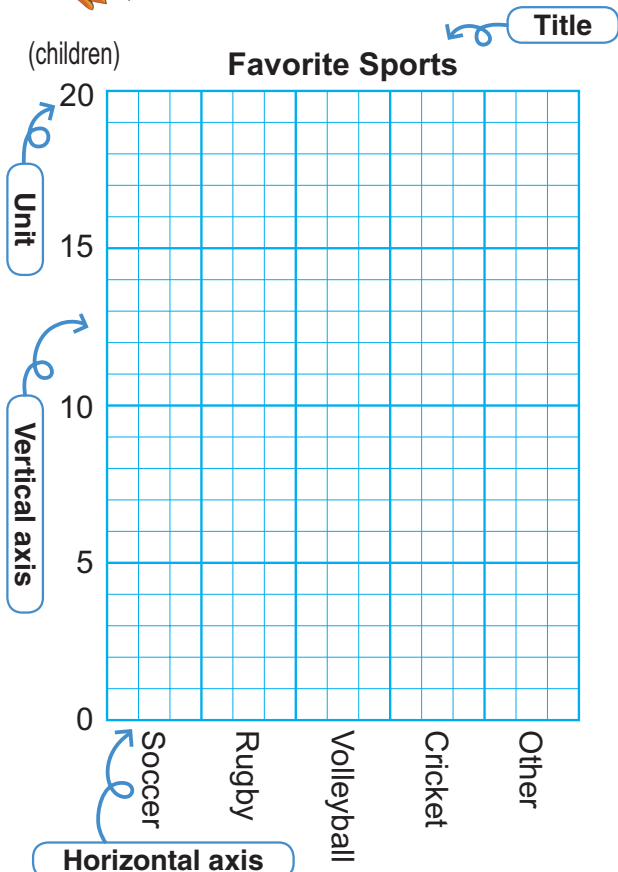


Favourite Sports

Sports	Number of children
Soccer	14
Rugby	10
Volleyball	7
Cricket	3
Others	2
Total	36



How to Draw a Bar Graph



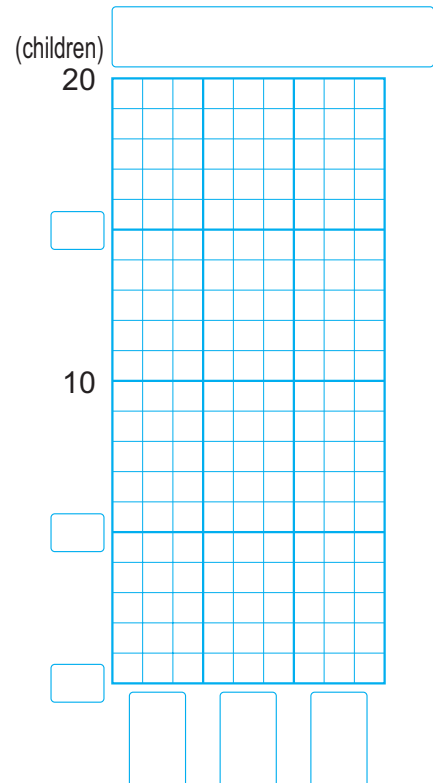
- ① Write each sport on the **horizontal axis**.
- ② Write the number of children on the **vertical axis**.
- ③ Write the **title** and **unit** of the vertical axis.
- ④ Draw bars according to the number of students.

7 We investigated the number of third graders in each class who said their favourite sport was soccer.

Let's draw a bar graph.

Number of Children Who Like Soccer

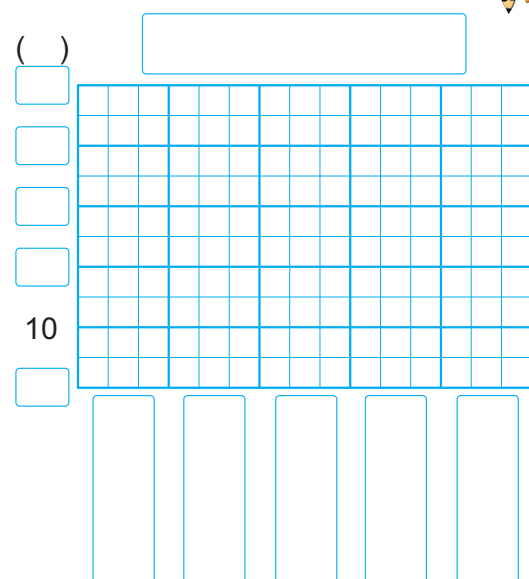
Class	Number of children
A	14
B	15
C	11
Total	40



8 We investigated the favourite sports of all the third graders. Let's draw a bar graph.

Favourite Sports

Sports	Number of children
Soccer	40
Rugby	35
Volleyball	15
Cricket	10
Others	5
Total	105



How many children should the unit scale of the bar graph be?

3

Combining Tables

1 The following tables show the types of tools and the number of tools that the grade 3 students borrowed in April, May and June.



Tools Borrowed in April

Type of tools	Number of tools
Rake	15
Knife	6
Spade	8
Others	5
Total	

Tools Borrowed in May

Type of tools	Number of tools
Rake	21
Knife	19
Spade	24
Others	8
Total	

Tools Borrowed in June

Type of tools	Number of tools
Rake	16
Knife	14
Spade	19
Others	9
Total	

- 1** What is the total number of tools that were borrowed in each month?
- 2** Which type of tool was borrowed the most in April, May and June?
- 3** Combine the tables for each month together to make 1 table.

Number of tools Borrowed

Type \ Month	April	May	June	Total
Rake	15	21	16	52
Knife	6	19		(D)
Spade	8			(E)
Others	5			(F)
Total	(A)	(B)	(C)	(G)

Tools Borrowed (April)		Tools Borrowed (May)		Tools Borrowed (June)	
Kind	Number of tools	Kind	Number of tools	Kind	Number of tools
Rake	15	Rake	21	Rake	16
Knife	6	Knife	19	Knife	14
Spade	8	Spade	24	Spade	19
Other	5	Others	8	Others	9
Total		Total		Total	

All we did was to combine the tables.



- ④ How many rakes were borrowed from April to June?
- ⑤ How many tools are in boxes Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ and Ⓕ?
- ⑥ What is the meaning of the number in Ⓖ?
- ⑦ Which kind of tools was borrowed the most from April to June?



Exercise

The following table is a record in hospital of the number of children who got sick in April, May and June, and the types of sickness.

- ① How many children were sick in each month?
- ② What type of illnesses happened the most from April to June?

Records of Sickness

Type \ Month	April	May	June	Total
Malaria	29	27	13	
Pneumonia	21	46	30	
Diarrhoea	13	7	4	
Sore eyes	7	4	2	
Others	10	14	6	
Total				



Report and Present Your Discovery

Compile your report to present your ideas to your friends.

I investigated about favourite fruits.



Let's write what you investigated, and why?

Favourite Fruits of the Grade 3 Students

1 Objective

I investigated whether there are differences between boys and girls.

2 Prediction

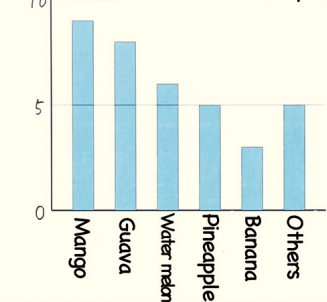
I observed that for lunch time, their favourite fruits are different.

Let's write what I expected.

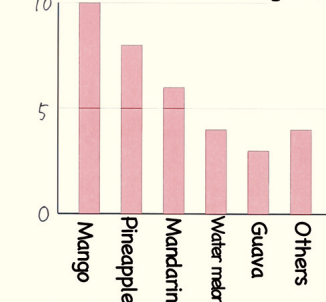
Let's show the table and graph to understand what I investigated.

Let's write what I found from tables and graphs.

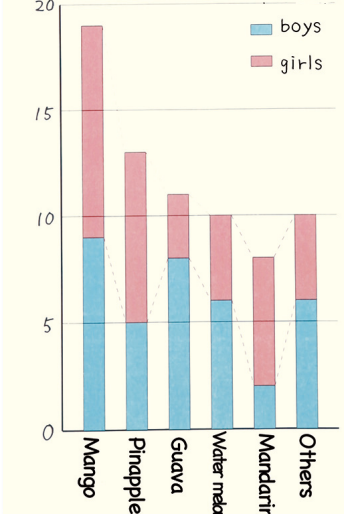
(children) Favourite Fruits (boys)



(children) Favourite Fruits (girls)



(children) Favourite Fruits (Total)



3 What was found

- Mango is the most favourite fruit for boys and girls.
- Ranking of favourites for boys and girls is different, but there are some similarities.
- Pineapple comes second place in total.

4 What was thought

- We expected the boys and girls like different types of fruits. However Mango, Watermelon and Mandarin are in the first four places both boys and girls.

Let's write what I thought comparing the expect.

What did you investigate? Let's explain what you investigated using tables and graphs.



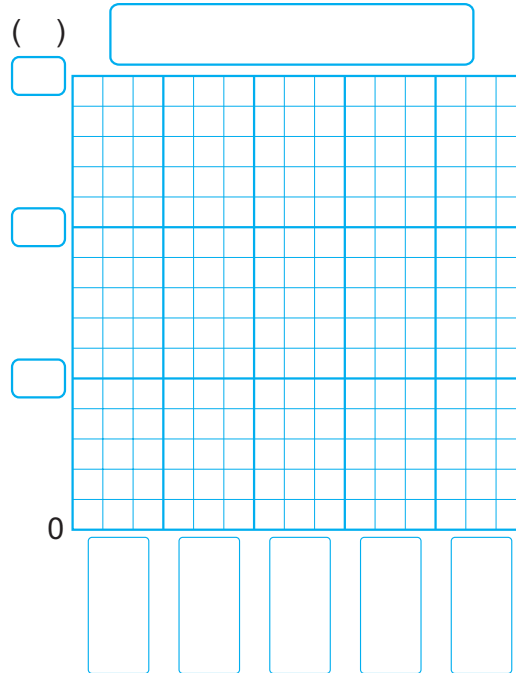
- 1 The following table shows favourite colours of children in Miriam's class. Let's draw a bar graph.

Pages 150 ~ 154



Favourite Colours

Colour	Number of children
Blue	12
Red	9
Green	6
Pink	3
Other	6
Total	36



- 2 The following table shows the number of children who hurt themselves in June at Nathan's school and the type of injuries. Write the correct numbers in the boxes from (A) to (H).

Pages 152 ~ 153



Records of Injuries (June)

Type \ Grade	1	2	3	4	5	6	Total
Scratch	3	(B)	2	5	3	4	21
Cut	(A)	2	2	3	(E)	3	(G)
Bruise	1	1	(C)	2	2	(F)	13
Other	2	3	1	1	0	2	9
Total	7	10	8	(D)	9	13	(H)

1 Children picked up empty cans at Kaia’s school.

The following table shows the number of cans picked up by the children in each grade.

● Reading numbers from table and graph.

Number of Empty Cans Picked Up

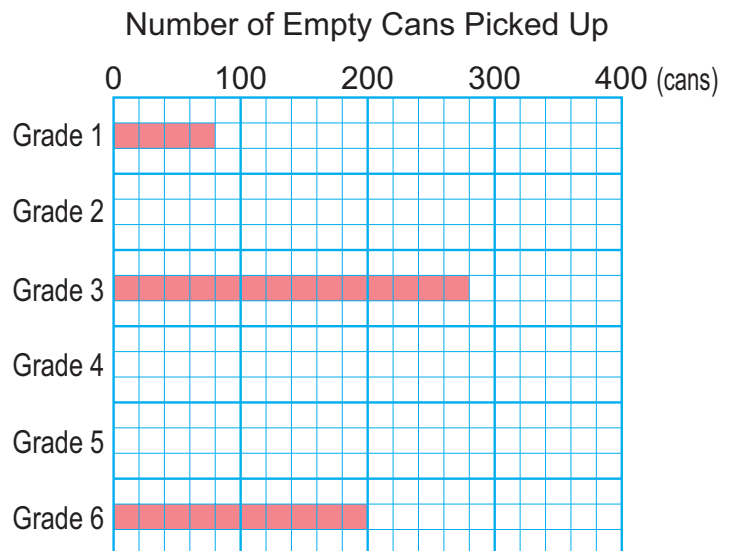
Grade	1	2	3	4	5	6	Total
Number of cans		120		240	160		

① What does the unit scale show on the graph on the right.

② Let’s write the number of empty cans picked up in the above table.

③ Let’s draw bars for grade 2, 4 and 5 on the graph.

④ Compare the table with the bar graph.



a) Which one makes it easier to read and which grade picked up the most cans?


b) Which one makes it easier to read and how many cans did the children in each grade pick up?

2 What can you learn from the above bar graph? Write as many points as possible.

● Knowing various things from a graph.


Multiplication of 2-digit Numbers

What kind of multiplication have we already learned?

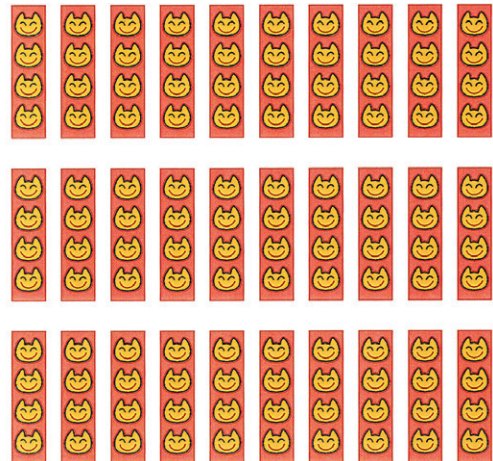


		Multiplier	
		1-digit	2-digit
Multiplicand	1-digit	8×6	3×10 <div style="border: 1px dashed blue; width: 40px; height: 20px; margin: 5px;"></div>
	2-digit	20×2 26×4	25×10 <div style="border: 1px dashed blue; width: 40px; height: 20px; margin: 5px;"></div>
	3-digit	400×9 315×6	<div style="border: 1px dashed blue; width: 40px; height: 20px; margin: 5px;"></div> <div style="border: 1px dashed blue; width: 40px; height: 20px; margin: 5px;"></div>

We learned multiplication using 2-digit numbers, but only up to 10. We haven't learned multiplication by 30, have we?



▶▶ There are 30 sets of stickers, each set with 4 stickers.



1 Multiplication by 20, 3090

1 How many stickers are there altogether?

1 Write an expression.

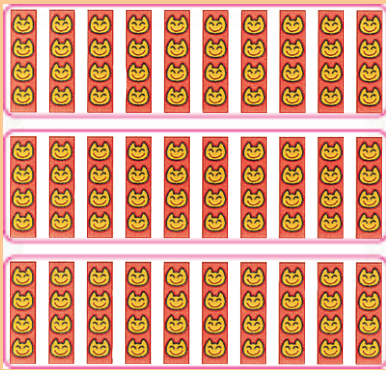
2 Let's think about how to calculate.



Let's think about how to multiply by a large multiplier



Sare's idea



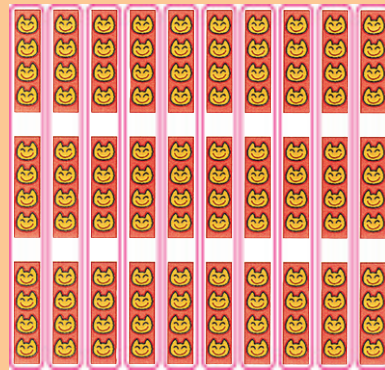
$$3 \times 10 \times 4 = \square$$



$$30 \times 4 = \square$$



Kekeni's idea



$$10 \times 3 \times 4 = \square$$



$$10 \times 12 = 12 \times 10 = \square$$



Since 30×4 is 10 times of 3×4 , the answer is same as 3×4 with 0 placed at the end.

$$30 \times 4 = 3 \times 4 \times 10$$

$$30 \times 4 = 12 \times 10$$

$$30 \times 4 = 120$$

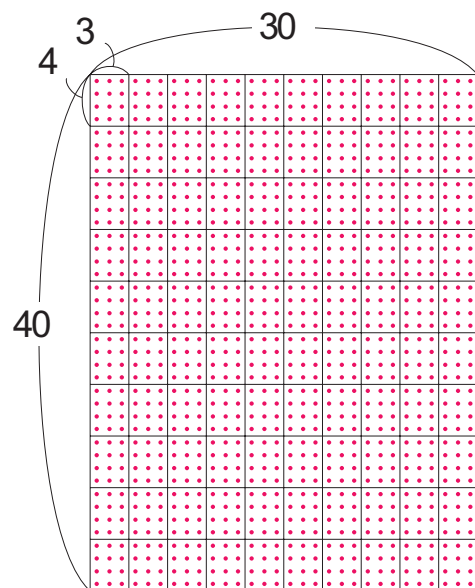
2 Let's think about how to calculate for 40×30 .

$$40 \times 30 = 4 \times 10 \times 3 \times 10$$

$$40 \times 30 = 4 \times 3 \times 10 \times 10$$

$$= \square \times \square$$

$$= \square$$



Since 40×30 is 100 times 4×3 , the answer is same as 4×3 with 00 placed at the end.

Exercise

① 3×40

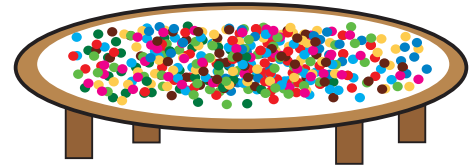
② 4×60

③ 70×30

④ 80×50

2 How to Calculate (2-digit numbers) × (2-digit numbers)

- 1 There are 21 children who are buying 13 marbles each at the market. How many marbles do they have altogether?



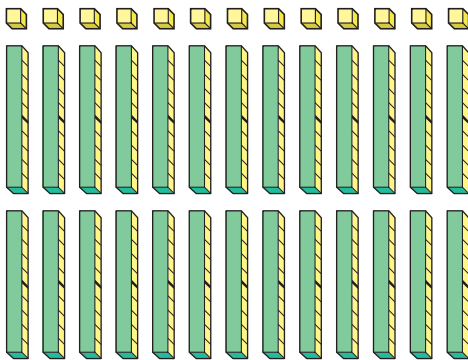
- 1 Write an expression.

- 2 Let's think about how to calculate.

Approximately, how many?



Let's think about how to multiply (2-digit numbers) × (2-digit numbers)



Vavi's idea

Split 13 marbles into 10 marbles and 3 marbles.

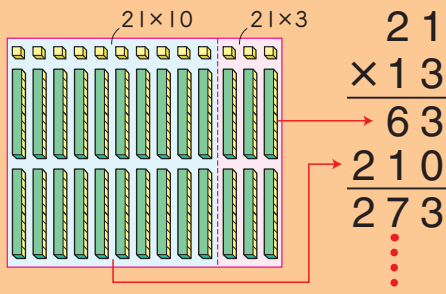
$$21 \times 13 \begin{cases} 21 \times 3 = \square \\ 21 \times 10 = \square \\ \hline \text{Total } \square \end{cases}$$

- 3 Where can you see 21×3 and 21×10 in the diagram? Circle them.
- 4 Let's think about how to calculate 21×13 in vertical form.

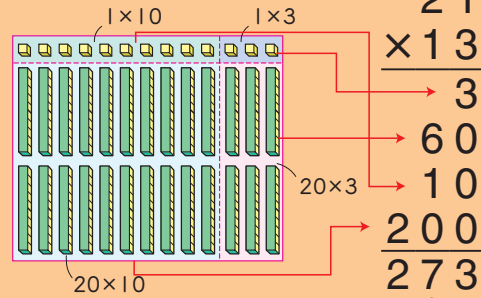
		2	1
	×	1	3



Yamo's idea



Gawi's idea



Multiplication Algorithm for 21×13 in Vertical Form

$$\begin{array}{r} 21 \\ \times 13 \\ \hline 63 \end{array}$$

Multiplicand
Multiplier

Multiply
21 by 3.
 21×3

$$\begin{array}{r} 21 \\ \times 13 \\ \hline 63 \\ 210 \end{array}$$

Multiply 21
by 10.
 21×10

There are
21 sets of
10s blocks.

$$\begin{array}{r} 21 \\ \times 13 \\ \hline 63 \\ 210 \\ \hline 273 \end{array}$$

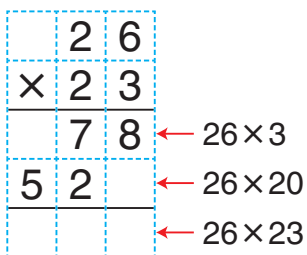
Add 63
and 210.

$$\begin{array}{r} 21 \\ \times 13 \\ \hline 63 \\ 210 \\ \hline 273 \end{array}$$

2

Let's think about how to multiply in vertical form.

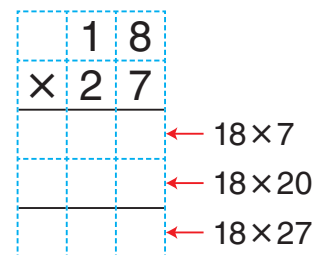
1 26×23



52 means 52
sets of what?



2 18×27



Exercise

Let's multiply in vertical form.

① 16×24

② 27×32

③ 15×12

④ 21×14

⑤ 36×23

⑥ 17×57

⑦ 27×24

⑧ 15×38

3 Let's think about how to multiply in vertical form.

1 58×46

		5	8	
	×	4	6	

← 58×6

← 58×40

← 58×46

2 37×63

		3	7	
	×	6	3	

← $37 \times \square$

← $37 \times \square$

← 37×63

4 Let's think about how to multiply 35×70 in vertical form.

1 Explain how the following two children multiply in vertical form.

Vavi's idea

35	35	35
$\times 70$	$\times 70$	$\times 70$
00	00	00
	245	245
		\square

Mero's idea

35	35
$\times 70$	$\times 70$
245	2450

2 Compare the answer of 70×35 with the answer of 35×70 .

Exercise

1 Let's multiply in vertical form.

- | | | | |
|------------------|------------------|------------------|------------------|
| ① 38×57 | ② 23×68 | ③ 57×87 | ④ 74×86 |
| ⑤ 29×44 | ⑥ 28×49 | ⑦ 46×97 | ⑧ 78×84 |
| ⑨ 38×40 | ⑩ 75×80 | ⑪ 25×70 | ⑫ 60×65 |

2 Waghi river guest house buys 20 mattresses that cost 98 kina each. How much is the total cost?

3 How to Calculate (3-digit numbers) × (2-digit numbers)

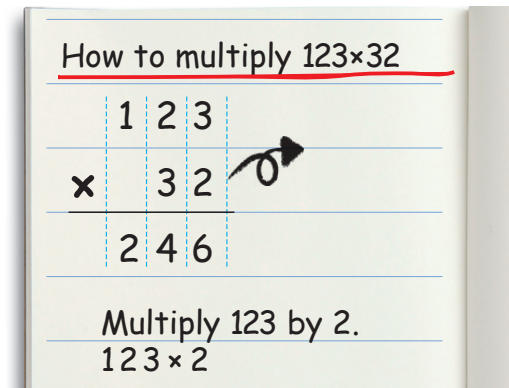
1 Let's think about how to multiply 123×32 .

Let's consider using the same method we had used for the multiplication of (2-digit numbers) × (2-digit numbers).

$$\begin{array}{r}
 123 \times 32 \\
 \hline
 123 \times 2 = \boxed{} \\
 123 \times \boxed{} = \boxed{} \\
 \hline
 \text{Total} \quad \boxed{}
 \end{array}$$



2 Let's write how to multiply 123×32 in vertical form in your exercise book.



We can calculate by using how to multiply (2-digit number) × (2-digit number) in vertical form.

3 Collect 385 kina for each family as a youth's group fund raising activities for a trip. There are 35 families in the clan.

The amount of 10 families is 3850 kina, so ...

- 1** Is the total cost larger than ten thousand?
- 2** Let's calculate in vertical form.



Exercise

Let's multiply in vertical form.

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| ① 423×21 | ② 222×43 | ③ 279×64 | ④ 418×68 |
| ⑤ 587×57 | ⑥ 898×41 | ⑦ 337×85 | ⑧ 684×58 |
| ⑨ 754×45 | ⑩ 615×28 | ⑪ 680×48 | ⑫ 940×25 |

Hilda multiplied 508×40 as follows. If there are any mistakes in the following multiplication, correct them.



How do we estimate 500×40 ?

$$\begin{array}{r} 508 \\ \times 40 \\ \hline 2320 \end{array}$$

Note the places when we multiply by 10, 20, ..., 90



Mental Calculations

- 4** Ruka's mother buys 4 pairs of shoes that cost 62 kina each in a supermarket. Let's think about how to find the total cost without using the vertical form.

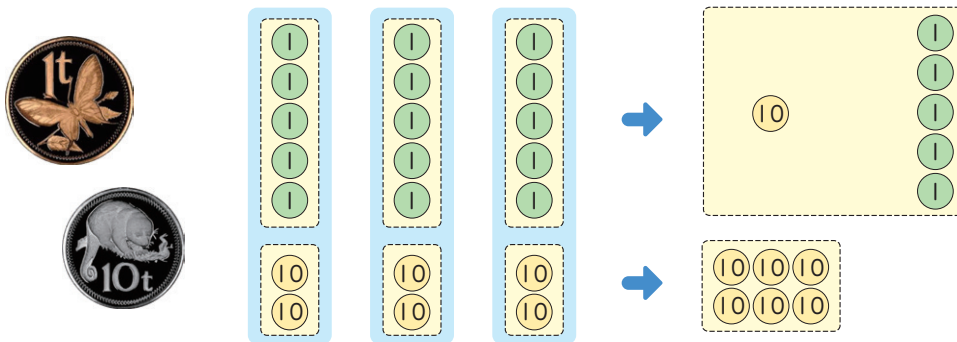


We can find the answer by splitting the multiplicand into two numbers for the ones and tens places.

By $60 \times 4 = 240$ and $2 \times 4 = 8$, $240 + 8 = 248$.



- 5** Let's think about how to calculate 25×3 mentally.



Exercise

- 1** Let's calculate in vertical form.

- ① 608×50 ② 503×60 ③ 409×40 ④ 703×80
 ⑤ 205×74 ⑥ 802×26 ⑦ 400×37 ⑧ 900×70

- 2** Let's calculate mentally.

- ① 52×3 ② 71×5 ③ 46×2 ④ 33×4



1 Let's calculate.

① 5×20

② 60×30

③ 40×50

④ 22×14

⑤ 19×31

⑥ 27×28

⑦ 36×43

⑧ 67×58

⑨ 73×47

⑩ 25×84

⑪ 48×60

⑫ 30×92



2 There are 34 children in Rataera's class.
Each child studies 75 minutes after school.
How many minutes did they study altogether?



3 Let's make problems by filling in the with a number.

①

$$\begin{array}{r}
 \square \square \square \\
 \times \quad \square \square \\
 \hline
 \square \square \square \\
 \square \square \square \\
 \hline
 \square \square \square \square
 \end{array}$$

②

$$\begin{array}{r}
 \square \square \square \\
 \times \quad \square \square \\
 \hline
 \square \square \square \square \\
 \square \square \square \square \\
 \hline
 \square \square \square \square \square
 \end{array}$$



1 Summarise how to multiply 45×63 .

● Understanding how to calculate in vertical form.

① Add the answers of 45×3 and of $45 \times \square$.

② (a) is from the multiplication of $\square \times \square$.

③ (b) is from the multiplication of $\square \times \square$,

and it means 270 sets of \square .

$$\begin{array}{r}
 45 \\
 \times 63 \\
 \hline
 135 \leftarrow \text{(a)} \\
 270 \leftarrow \text{(b)} \\
 \hline
 2835
 \end{array}$$

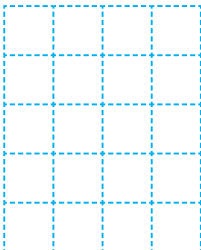
2 Are the following calculation in vertical form correct?

If there are any mistakes in the following multiplications,

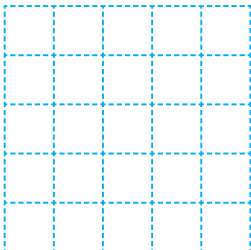
correct them.

● Multiplying in appropriate ways.

①

$$\begin{array}{r}
 54 \\
 \times 94 \\
 \hline
 206 \\
 4560 \\
 \hline
 4766
 \end{array}$$


②

$$\begin{array}{r}
 408 \\
 \times 65 \\
 \hline
 240 \\
 288 \\
 \hline
 3120
 \end{array}$$


3 You need 43 sheets of papers to make each collection of work.

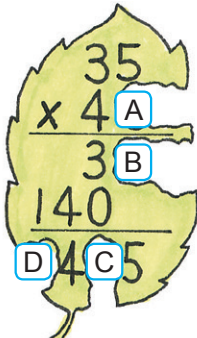
You made 38 collections of work. How many sheets of paper are there altogether?

● Express a problem as an expression and finding the answer.

4 Let's write numbers in the spaces below.


● Understanding the structure of multiplication and solving problem.

①



$$\begin{array}{r}
 35 \\
 \times 4 \text{ (A)} \\
 \hline
 3 \text{ (B)} \\
 140 \\
 \hline
 \text{D} 4 \text{ (C)} 5
 \end{array}$$

②

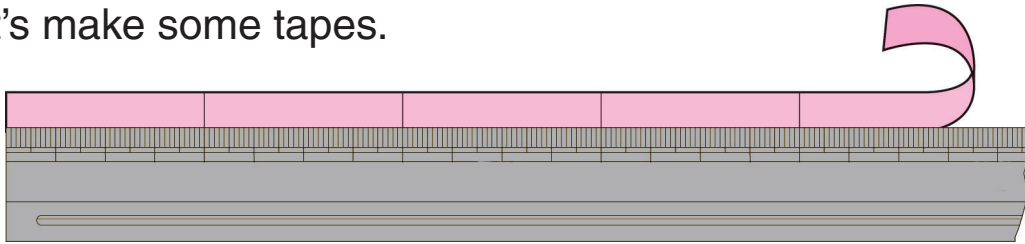


$$\begin{array}{r}
 9 \text{ (A)} \\
 \times 36 \\
 \hline
 \text{B} 76 \\
 \text{C} \text{ (D)} 8 \\
 \hline
 345 \text{ (E)}
 \end{array}$$

Calculation of multiples

Making Tapes

1 Let's make some tapes.



1 Make a tape which length is 2 sets of .

Where should we cut it? And what is its length in cm?

$$2 \times 4 = \square$$

2 Make a tape which length is 3 sets of .

Where should we cut it? And what is its length in cm?

$$3 \times 4 = \square$$



1 set, 2 sets and 3 sets are called 1 time, 2 times and 3 times.

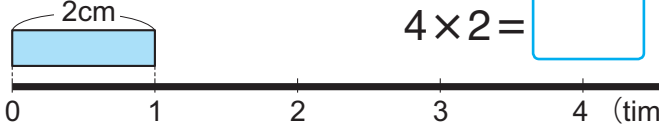
The original number should be 1 times itself.



cm	4	?
Times	1	3

2 Let's find 4 times the following length.

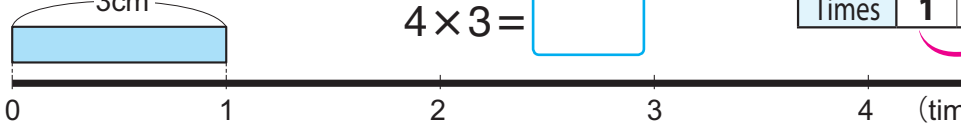
1



$$4 \times 2 = \square$$

cm	2	?
Times	1	4

2



$$4 \times 3 = \square$$

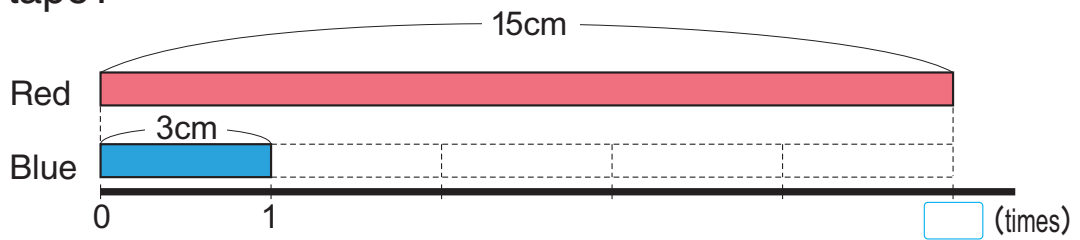
cm	3	?
Times	1	4

3 A kettle holds 8 times the amount of hot water in a coffee cup. A coffee cup holds 2 dL of hot water. How many dL of hot water can be poured into the kettle?

dL	2	?
Times	1	8



- 4** Kila has 15 cm of red tape and 3 cm of blue tape. How many times the length of the blue tape is equal to the length of the red tape?



If 3 cm is regarded as 1 unit, 15 cm is 5 units of 3 cm. This is called “15 cm is 5 times 3 cm”. To obtain the number of units 3 cm is equal to 15 cm, calculate $15 \div 3$.

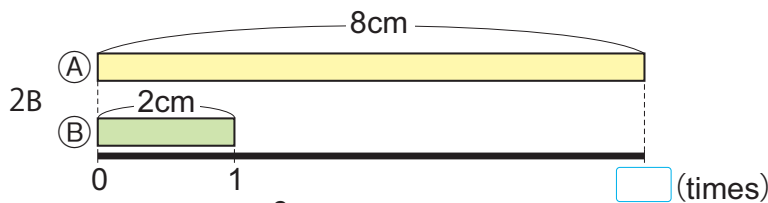
cm	3	15
Times	1	?

$\div 3$ $\div 3$

To make 3 to 1, what number should we divide 3 with.

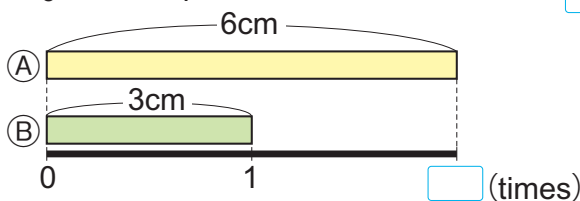


- 5** How many times of tape (B) is equal to tape (A) ?



cm	2	8
Times	1	?

$\div 2$ $\div 2$



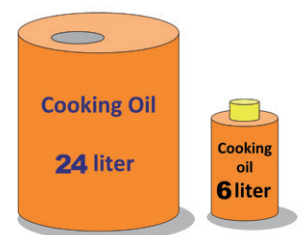
cm	3	6
Times	1	?

$\div 3$ $\div 3$

- 6** The big cooking oil container for Rose’s aunty holds 24 L of cooking oil. The container for Angi’s aunty holds 6 L of cooking oil. How many times the cooking oil for Angi’s aunty’s container can be held in Rose’s aunty’s container?

L	6	24
Times	1	?

$\div 6$ $\div 6$



▶▶ Which one is the heaviest?



1 How to Represent Weight



Can we compare weights by hand?

1 Let's line up objects from the heaviest to the lightest.



Let's investigate how to compare weights and how to represent weights with numbers.

1 Let's try comparing weights by using some tools.



2 Express weight as numbers by using clips or 5 toea coins.

Objects measured	Paper clips	5 toea coin
Scissors		
Compass		



Scissors

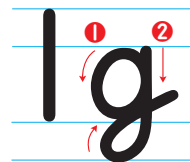
88 of 5 toea coin



Weight is measured by finding how many units of weight something is equal to.



There is a unit called gram that is used to measure weight. 1 gram is written as 1 g.



20 toea is 10 g.



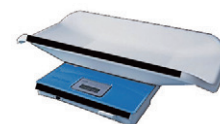
3 What is the weight of a pair of scissors, a compass and a glue, respectively if a paper clip is 1 g?



What kind of measuring instruments for weight are around us?

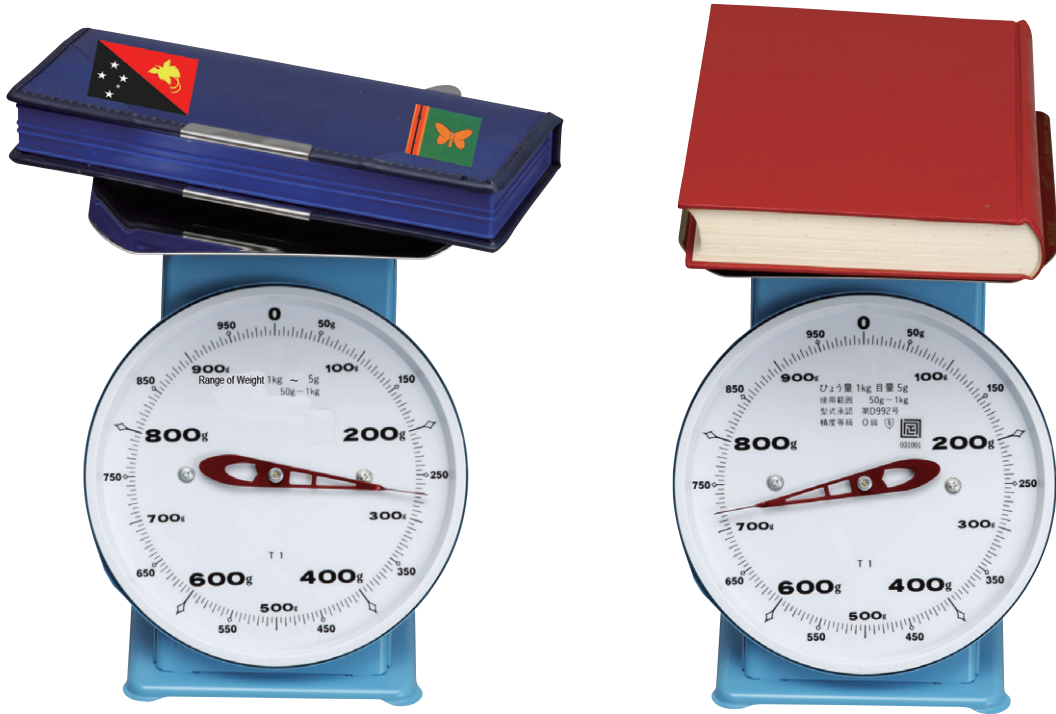


Electric scale



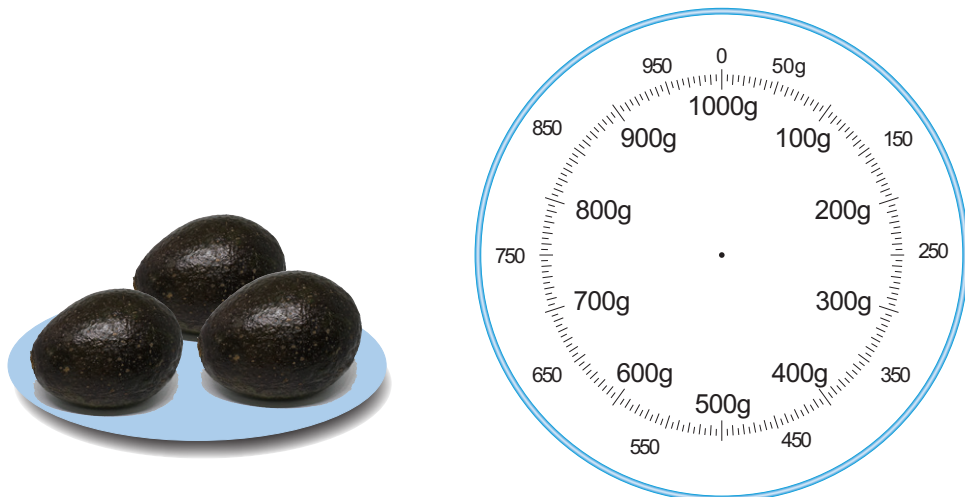
2 A scale is used to measure weight.

Measure the weight of the following objects by using the scale.

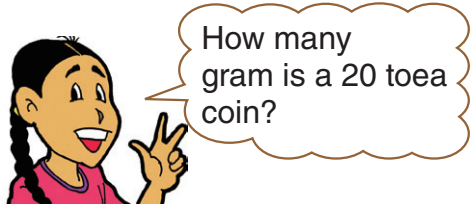


- 1** Up to how many grams can we measure on the above scale?
- 2** How many grams does the smallest unit express?
- 3** How many grams is the weight of the pencil case? And how many grams is the weight of the book?
- 4** The weight of the plate of avocados is 875 g.

Draw a needle on the scale shown on the right of this weight.



3 How much is the weight of 100 coins of 20 toea?



1000 g is 1 kilogram and is written as 1 kg.

$1 \text{ kg} = 1000 \text{ g}$

1 kg

1 L of water weighs 1 kg.

This is similar to the relationship when measuring length.
1 km = 1000 m

4 Make objects that weighs 1 kg.



Book



Sago

How to Use a Scale

- ① Put the scale on a flat surface.
- ② Adjust the needle to 0.
- ③ Read the scale directly from the front.

5 Look for objects where different units of weight are used.

There is a unit called tonne to measure weight. 1000 kg is equal to 1 tonne and is written as 1 t (metric ton).

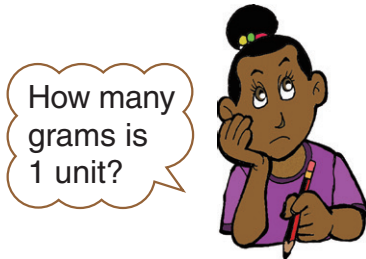
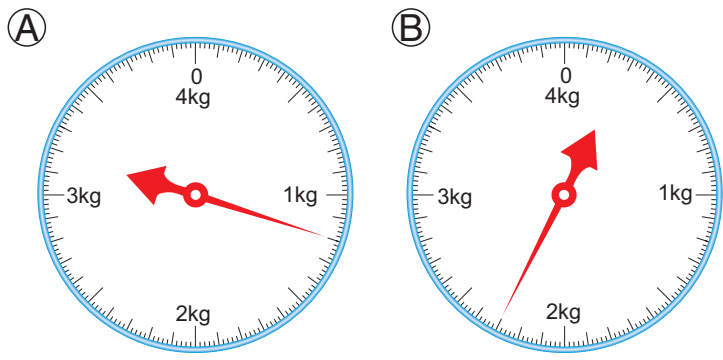
$1 \text{ t} = 1000 \text{ kg}$

1 t



There are 100 of 10 kg rice bags on a pallet. Total weight is 1000 kg or 1 t.

6 Let's look at the scales below.



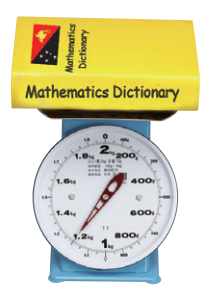
- 1 Read the weights shown on the scales. For example, 1 kg 500 g is called as “one kilo and five hundred grams” in short.
- 2 Draw an ↑ for the following weight on the scales above.
 - ① 1 kg 800 g ② 3 kg 300 g

7 Gibson weighs 31.8 kg.
 How many kg and g is his weight?
 0.1 kg = 100 g
 31.8 kg = kg g



8 Let's measure the weight of different objects using the scale.

Let's estimate the weight first.



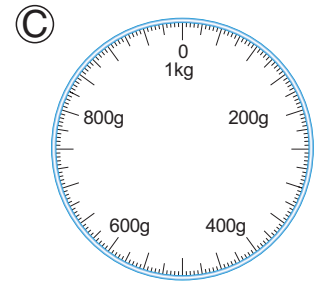
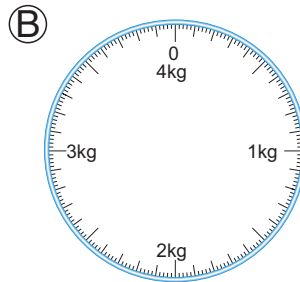
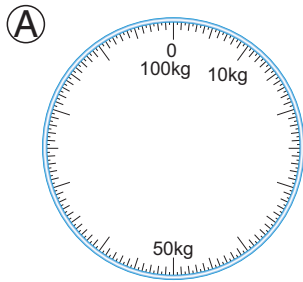
Objects measured	Weight expected	Weight measured
Dictionary		
Pencil case		

9 Identify the appropriate scale for the following items.

1 Watermelon

2 Textbook

3 Your weight



Units of Quantities

10 We have learned the units of length, amount of water and weight. There are units of quantities as follows.

Length mm, cm, m, km

Weight g, kg, t

Amount of water mL, dL, L

1 Fill in the with a number.

$$1 \text{ m} = \text{ mm}$$

$$1 \text{ L} = \text{ mL}$$

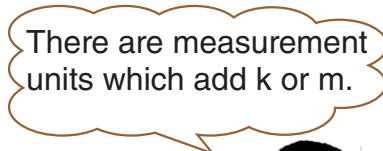
$$1 \text{ km} = \text{ m}$$

$$1 \text{ kg} = \text{ g}$$

2 Let's discuss what you found. Then write down your answer in your exercise books.



The base units of measurement are m, L and g aren't they?



There are measurement units which add k or m.

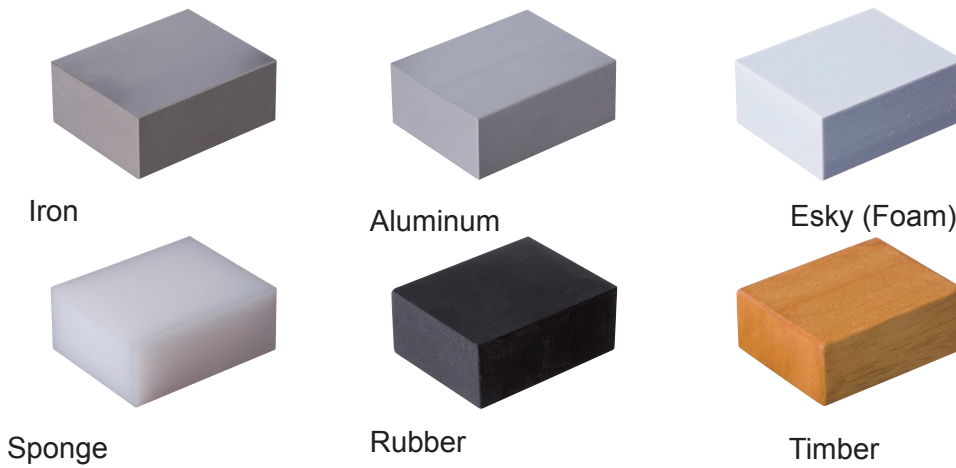


1000 of a unit develops a new unit.

Amount of Block and Weight

11 Let's investigate the following using a scale.

- 1 There are pieces of iron, aluminum, sponge, esky, rubber and timber each with the same size of block. Do they weigh the same? Guess the answer and compare their real weights.



Different materials have different weights even if they are of the same size.

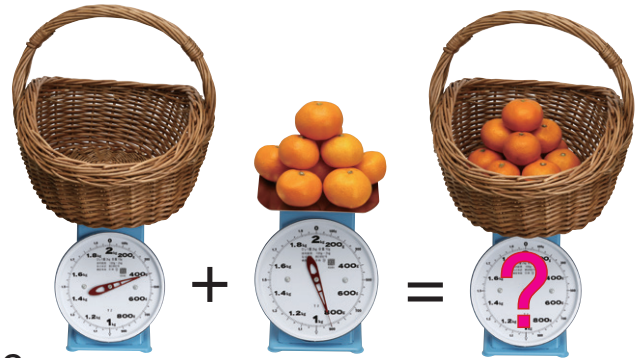
- 2 Measure the weight of some clay. Then change the shape and measure it again.

Explain what happens to the weight.



2 Calculation of Weight

- 1 There are 900 g of oranges in a basket that weighs 400 g.



- 1 What is the total weight in g?
400 g + 900 g
- 2 What is the value in kg and g?

- 2 The bag weighs 900 g and the total weight of bag with first aid kits is 3 kg 200 g.
What is the value in kg and g of the first aid kits?



Exercise

- 1 Tom weighs 24 kg and George weighs 26 kg. If Tom stands on a scale while carrying George on his back, how many kg will the needle of the scale show?
- 2 Junior weighs 3200 g at birth and weighs 9100 g on his 1st birthday. By how many g has the weight increased during the 1 year?





1 Solve the following problems.

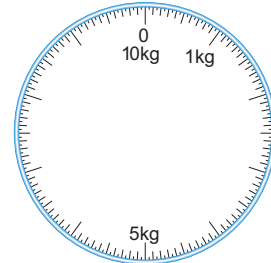
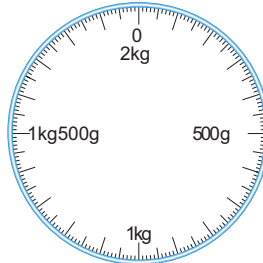
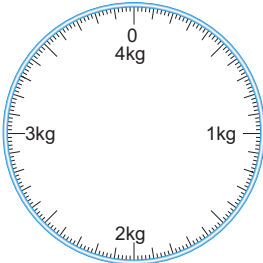
Pages 173,175



- ① When we add 1 kg of sand and 2 kg of sand, how many kg are there altogether? And how many g are there?
- ② When we add 2 L of water and 3 L of water, how many L are there altogether? And how many kg are there?

2 How many g is one unit on the following scales?

Page 173

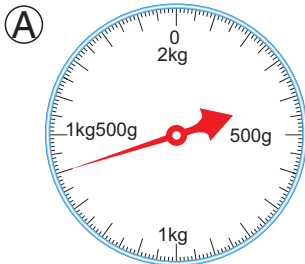


3 Solve the following problems.

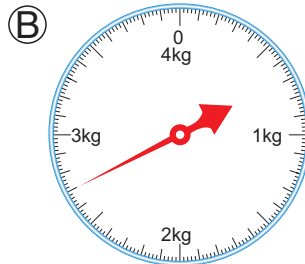
Page 172



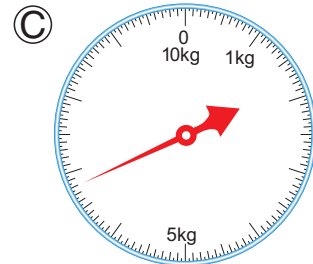
- ① How many g and kg does each of the following scales (A ~ C) show? How many kg are there?



kg g
 g



kg g
 g



kg g
 g

- ② On the number line, mark ↓ where (A), (B) and (C) are.



Let's calculate.

Grade 3

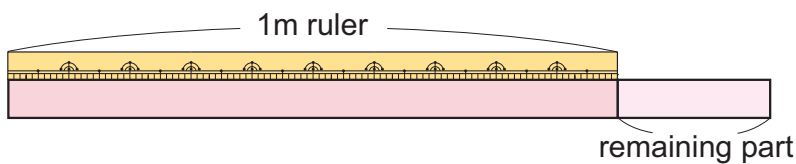
Do you remember?



- ① 84×65
- ② 56×90
- ③ 457×42
- ④ 209×70

▶▶ There is a 1 m tape. Let's measure the lengths of different objects by using the 1 m tape.

The length is 1 m and a remaining part. How can we represent the remaining part in metres?

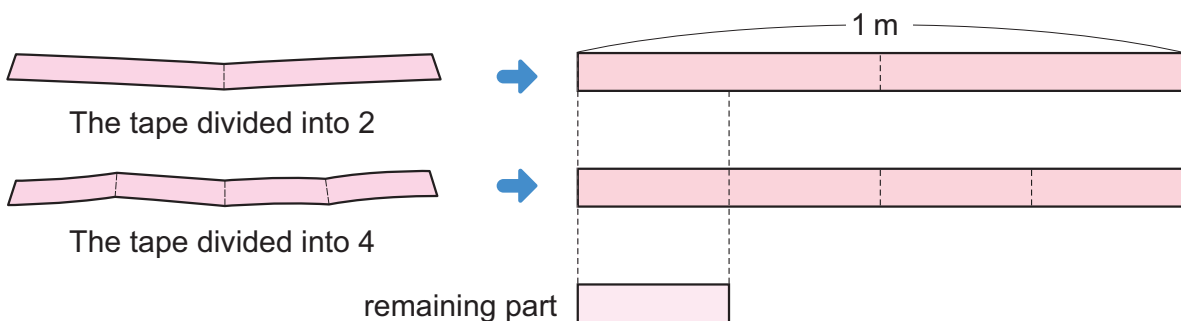


The length of the remaining part is less than 1 m, isn't it?

1 Fractions



1 Divide a 1 m tape into 2 and 4 equal parts respectively.



Let's compare the lengths of the divided parts respectively with the length of the remaining part.



Let's think about how to represent the given quantities in fractions.

The length of remaining part is equal to one part that is made by dividing 1 m into 4 equal parts.

We learned that one part of a thing that is divided into 4 equal parts is expressed as $\frac{1}{4}$ of a thing in grade 2.

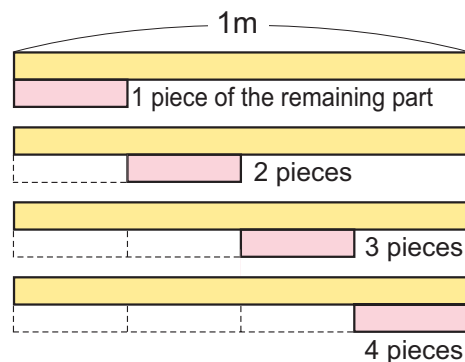


The length of one part made by dividing 1 m into 4 equal parts is called “one fourth of a metre” or “one quarter metre” and is written as $\frac{1}{4}$ m.

$$\frac{1}{4}$$

The fraction $\frac{1}{4}$ is shown with circled numbers: 3 above the 1, 1 above the 4, and 2 below the 4.

2 How many pieces of the remaining part are equal to 1 m?

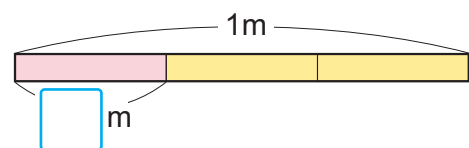


4 pieces of the length of the remaining part are equal to 1 m. The length of one part is obtained by dividing 1 m into 4 equal parts. The length of the remaining part is $\frac{1}{4}$ m.

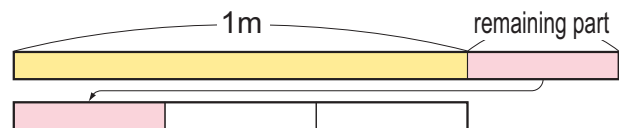
Exercise

How many metres are there?

① The length of one part is made by dividing 1 m into 3 equal parts is m.



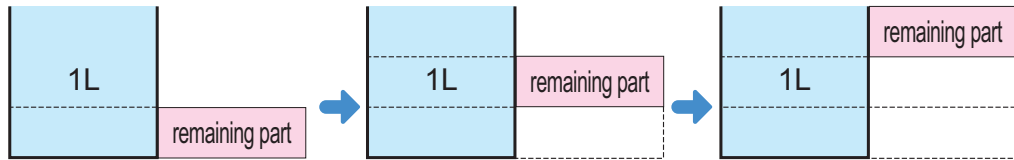
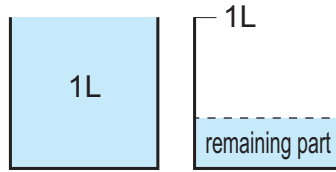
② The length of the remaining part for which 3 pieces are equal to 1 m is m.



③ The length of one part that is made by dividing 1 m into 5 equal parts is m.

④ The length of the remaining part for which 2 pieces are equal to 1 m is m.

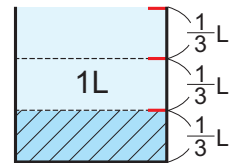
3 The amount of water in the thermos bottle is 1 L and more.
How much more in L?



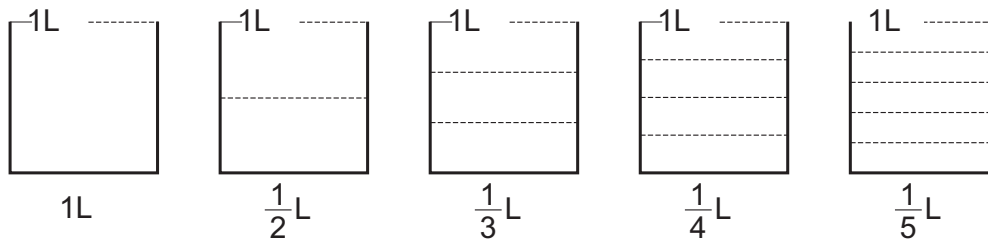
remaining parts make 1 L.



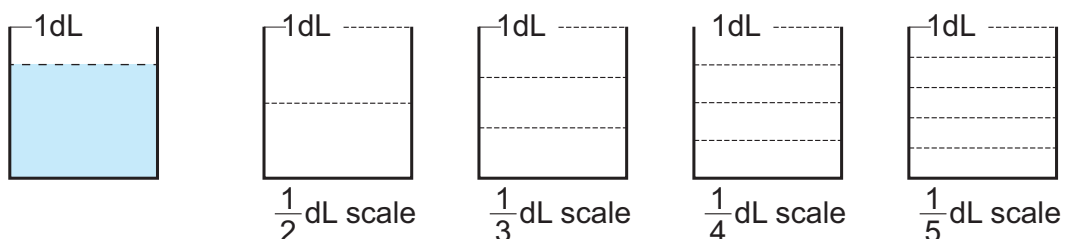
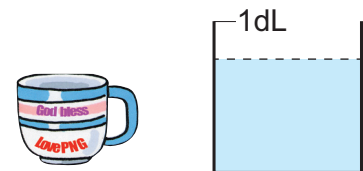
The amount for which 3 remaining parts are equal to 1 L is equal to the amount of one part. The amount is obtained by dividing 1 L into 3 equal parts. The amount is $\frac{1}{3}$ L.



4 Colour in the portion of the amounts.

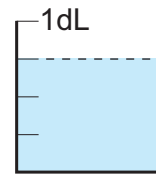


5 How many dL is the amount of water in the cup? Which measuring cup should we use to find?

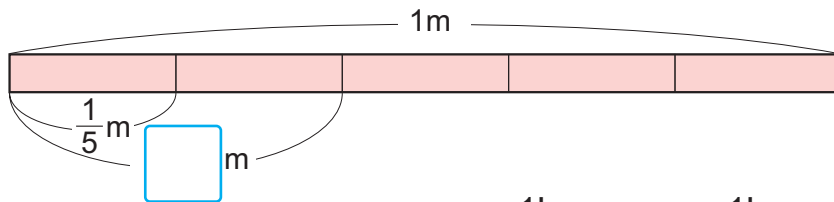




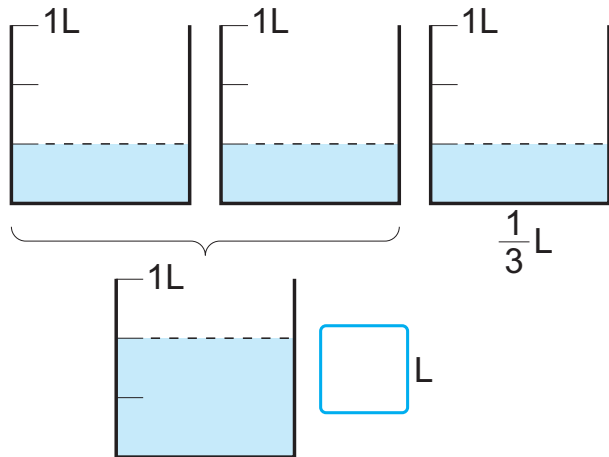
The amount of 3 sets of $\frac{1}{4}$ dL is called “three fourth of a decilitre” and is written as “ $\frac{3}{4}$ dL.”



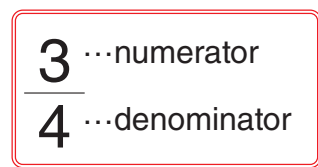
6 When a 1 m tape is divided into 5 equal parts, how many metres are the length of 2 parts?



7 When a 1 L of milk is divided among 3 children equally, how many litres are there for 2 children?



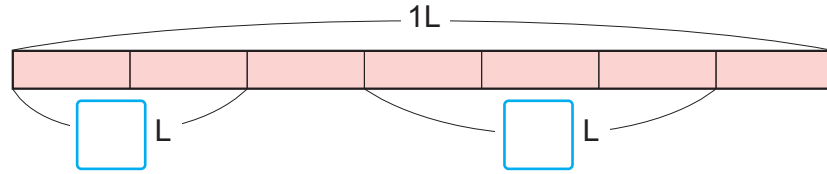
Numbers such as $\frac{1}{3}$, $\frac{3}{4}$ and $\frac{2}{5}$ are called fractions. **The number below the bar is called denominator and the number above the bar is called numerator.**



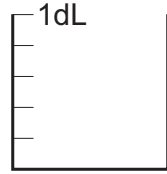
The denominator represents the number of equal parts of the original quantities, such as 1 m and 1 L, and the numerator represents the number of the collected parts.

Exercise

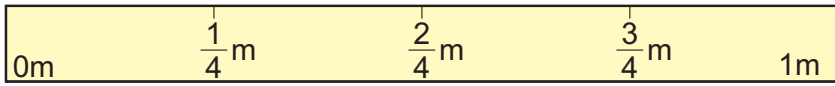
1 Let's represent fractions.



2 Let's colour in the portion of $\frac{4}{5}$ dL.

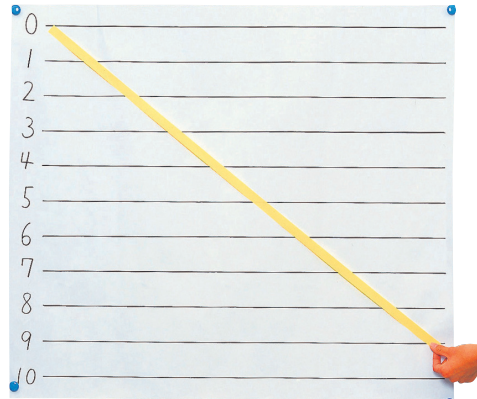


Measuring Different Things Using Fractions



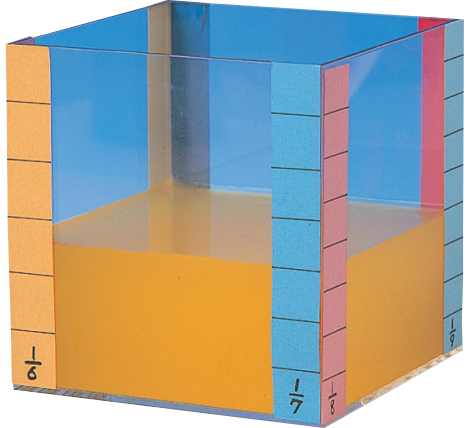
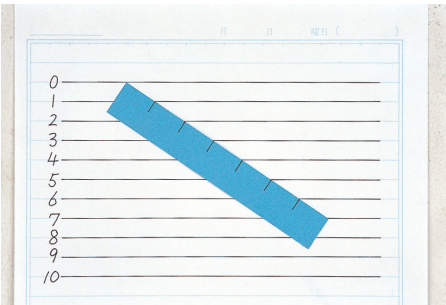
1 Let's make a ruler to measure fractions by dividing a 1 m tape into equal sections. Make a ruler to measure fractions with denominators of 3, 5, 6, 7, 9 and 10 and then measure the lengths of different objects.

How to Make a Ruler with Denominator of 9



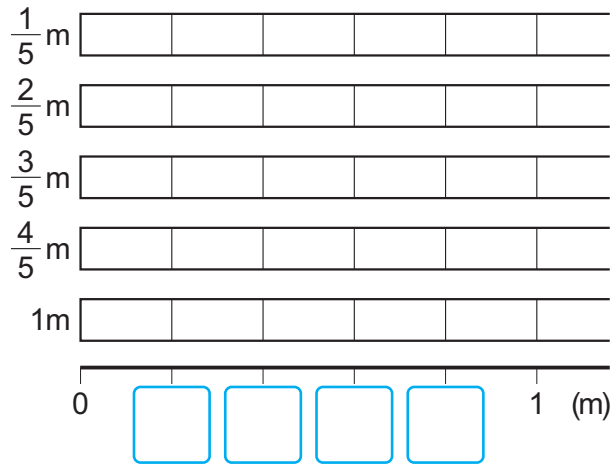
2 Let's make a 1 L measuring cup to measure fractions by constructing a scale of fractions.

How to Construct a Fraction Scale of Which the Denominator Is 7



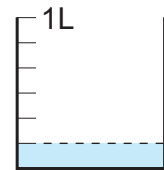
2 Structure of Fractions

1 Let's colour each bar from the left to a length that matches each fraction.



- ① How many $\frac{1}{5}$ m are in $\frac{3}{5}$ m?
- ② Fill in the with a fraction.
- ③ How many $\frac{1}{5}$ m are in 1 m?
- ④ Which is longer, $\frac{3}{5}$ m or $\frac{4}{5}$ m?

2 How many L are 6 sets of $\frac{1}{6}$ L?
Fractions with the same denominator and numerator are equal to 1.



$$\frac{6}{6} = 1$$

Exercise

Let's compare the following fractions and represent the relations using inequality signs.

- ① Which is longer, $\frac{3}{4}$ m or $\frac{2}{4}$ m?
- ② Which is larger, $\frac{5}{7}$ L or $\frac{6}{7}$ L?
- ③ Which is larger, $\frac{7}{8}$ dL or 1 dL?

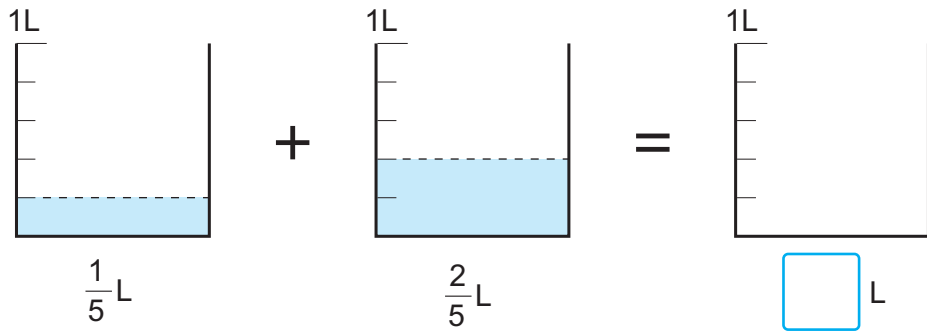
Do you remember?
< less than
> larger than
= equal



3

Addition and Subtraction of Fractions

- 1** Elijah drank $\frac{1}{5}$ L of milk yesterday and $\frac{2}{5}$ L of milk today.
How many litres did he drink altogether?



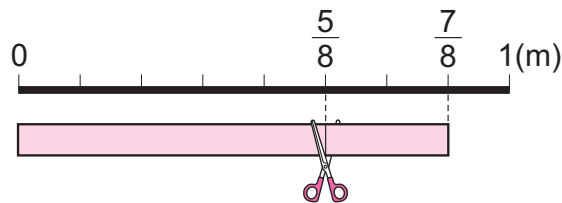
$$\frac{1}{5} + \frac{2}{5} = \square$$

Consider how many $\frac{1}{5}$ are in the amount



- 2** From a $\frac{7}{8}$ m tape, $\frac{5}{8}$ m was cut off. How many metres are left?

$$\frac{7}{8} - \frac{5}{8} = \square$$

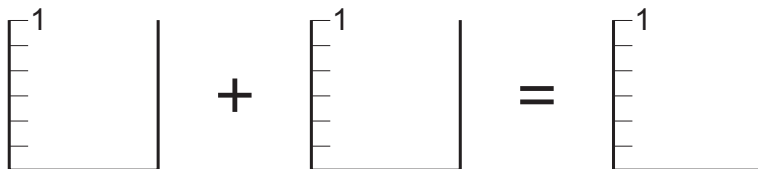


How many sets of $\frac{1}{8}$ are left?



Exercise

- 1** Let's represent a calculation $\frac{2}{6} + \frac{3}{6}$ below.



- 2** Let's calculate.

① $\frac{2}{7} + \frac{4}{7}$

② $\frac{3}{4} - \frac{1}{4}$

③ $\frac{4}{5} - \frac{2}{5}$

1 Fill in the with a number.

Page 182



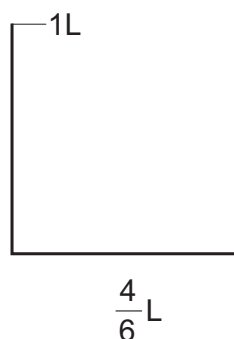
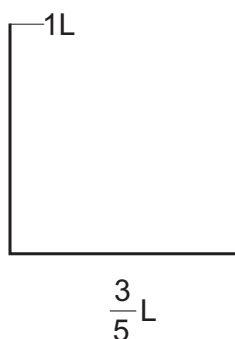
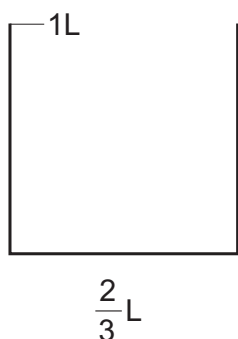
① $\frac{3}{5}$ dL is sets of $\frac{1}{5}$ dL. ② $\frac{\text{input}}{\text{input}}$ m is 5 sets of $\frac{1}{6}$ m.

③ sets of $\frac{1}{8}$ L is $\frac{3}{8}$ L. ④ 5 sets of $\frac{1}{5}$ cm is cm.

Pages 179 ~ 181



2 Let's colour the portion for the following numbers.



3 Which is bigger? Fill in the with inequality signs.

Page 182



① $\frac{2}{3}$ $\frac{1}{3}$ ② $\frac{5}{8}$ $\frac{7}{8}$ ③ 1 $\frac{3}{4}$

4 Let's calculate.

Page 183



① $\frac{1}{4} + \frac{3}{4}$ ② $\frac{2}{8} + \frac{4}{8}$ ③ $\frac{5}{6} - \frac{4}{6}$ ④ $1 - \frac{1}{3}$

Let's calculate.

Grade 3

Do you remember?



① $24 \div 6$ ② $35 \div 7$ ③ $9 \div 1$ ④ $0 \div 7$
 ⑤ $12 \div 5$ ⑥ $40 \div 9$ ⑦ $31 \div 4$ ⑧ $66 \div 8$



- 1** A 1 m tape was divided into 6 equal parts, and we took 4 pieces of those parts. Let's represent the section that was taken by fractions.

● Understanding means of fractions.

- 2** Fill in the with a number.

● Understanding the system of fractions.

① 3 sets of $\frac{1}{4}$ m is $\frac{\text{input}}{\text{input}}$ m.

② sets of $\frac{1}{7}$ L is $\frac{4}{7}$ L.

③ 4 sets of $\frac{\text{input}}{\text{input}}$ m is $\frac{4}{10}$ m.

④ sets of $\frac{1}{4}$ dL is 1dL.

- 3** Let's make an expression of the answer $\frac{7}{8}$ by filling in the with number.

● Understanding the addition of fractions.

$$\frac{\text{input}}{8} + \frac{\text{input}}{8} = \frac{7}{8}$$

- 4** There are 5 cards from 1 to 5 as shown below.

Let's make fractions with the denominator 5 using these cards as numerator.

● Understanding the size and the structure of fractions.



① Make a fraction for which 3 sets are equal to $\frac{3}{5}$.

② Make a fraction that is equal to 1.

③ Make fractions that are smaller than $\frac{4}{5}$.

④ Make fractions that are larger than $\frac{3}{5}$ and smaller than 1.

Math Sentences Using the

►► Represent the mathematical sentences for the following situations shown in the photos below.



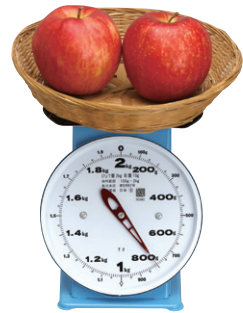
There are two kinds of weight as fruits and holders.



To subtract two weights makes no sense.



I can make problems to do additions.



- 1** The total weight of two apples on a bamboo tray.
- 2** The total weight of eight lalau fruit on glass dish.
- 3** The total weight of eight tomatoes on wooden bowl.

Math Sentence 1	<input style="width: 100%; height: 30px;" type="text"/>	+	<input style="width: 100%; height: 30px;" type="text"/>	=	<input style="width: 100%; height: 30px;" type="text"/>
Math Sentence 2	<input style="width: 100%; height: 30px;" type="text"/>	+	<input style="width: 100%; height: 30px;" type="text"/>	=	<input style="width: 100%; height: 30px;" type="text"/>
Math Sentence 3	<input style="width: 100%; height: 30px;" type="text"/>	+	<input style="width: 100%; height: 30px;" type="text"/>	=	<input style="width: 100%; height: 30px;" type="text"/>
	↓		↓		↓
	Weight of fruits	+	Weight of holders	=	Total weight

▶▶ Represent the mathematical sentences for the following picture situations.



1 Sepik mask K150



1 Laplap roll K200

6

1 Necklace top K350

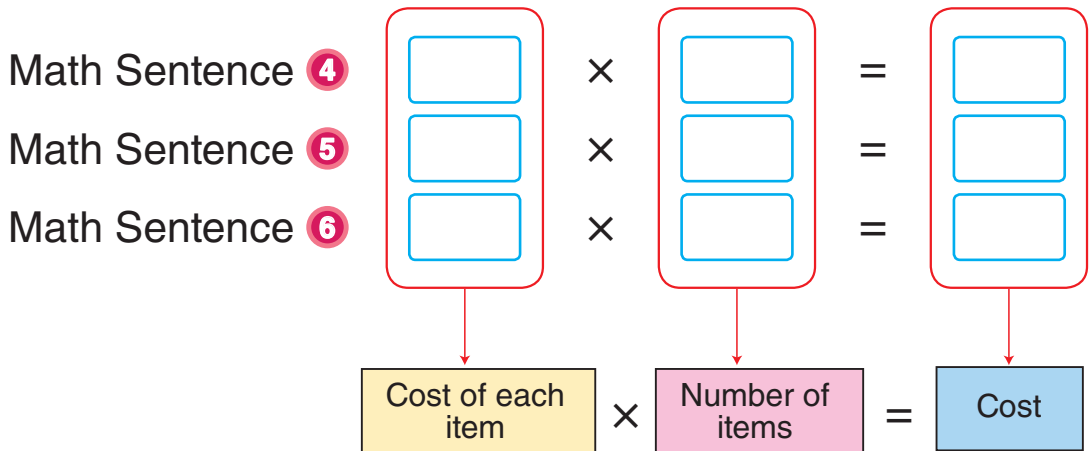


This is a shopping situation.

We can make multiplication problems.



- 4 The cost of 3 masks for 150 kina each.
- 5 The cost of 4 laplap rolls for 200 kina each.
- 6 The cost of 2 necklace tops for 350 kina each.



Let's think about how to make mathematical sentence using words and and how to find the number which fits the .

1

Math Sentences of Addition

1 Let's think about the following problem.

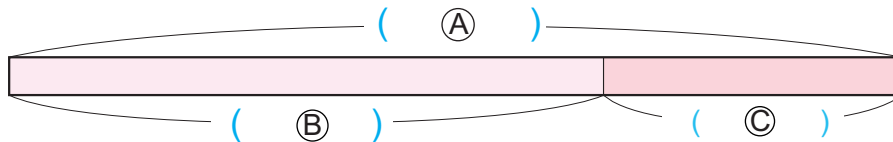
There are 900 g of mandarins in a bowl. The bowl weighs 300 g. What is the weight of mandarins in g?

1 Let's complete the diagram below by filling in the () with words.

Weight of mandarins

Weight of a bowl

Total weight



2 Let's complete the mathematical sentence with words from the diagram 1.

$$\boxed{\phantom{\text{Weight of mandarins}}} + \boxed{\phantom{\text{Weight of a bowl}}} = \boxed{\phantom{\text{Total weight}}}$$

3 Let's represent the unknown number in the mathematical sentence by using \square .

$$\square + \boxed{\phantom{\text{Weight of a bowl}}} = \boxed{\phantom{\text{Total weight}}}$$

4 Let's think about how to find the number in the \square .



Put numbers in the \square in order.

Think of it using the figure.





Kekeni's idea

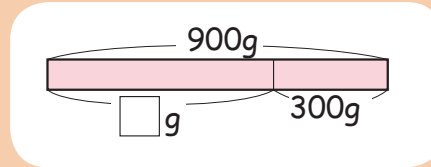
To find the number which fits $\square + 300 = 900$, put numbers, 100, 200, ... into \square .

$$\begin{aligned}
 100 + 300 &< 900 \\
 200 + 300 &< 900 \\
 &\vdots \\
 600 + 300 &= 900
 \end{aligned}$$



Naiko's idea

Consider how to use the diagram.



$$\begin{aligned}
 \square + 300 &= 900 \\
 \square &= 900 - 300
 \end{aligned}$$

- 2** The weight of a 500 g avocado on the plate is 850 g. What is the weight of the plate in g ?

Let's draw the diagram or write a mathematical sentence for the weight of the plate by using \square g and find \square .



Exercise

The weight of 400 g bananas in the basket is 600 g. What is the weight of the basket in g? Let's draw the diagram or write mathematical sentence for the weight of the basket by using \square g and find \square .



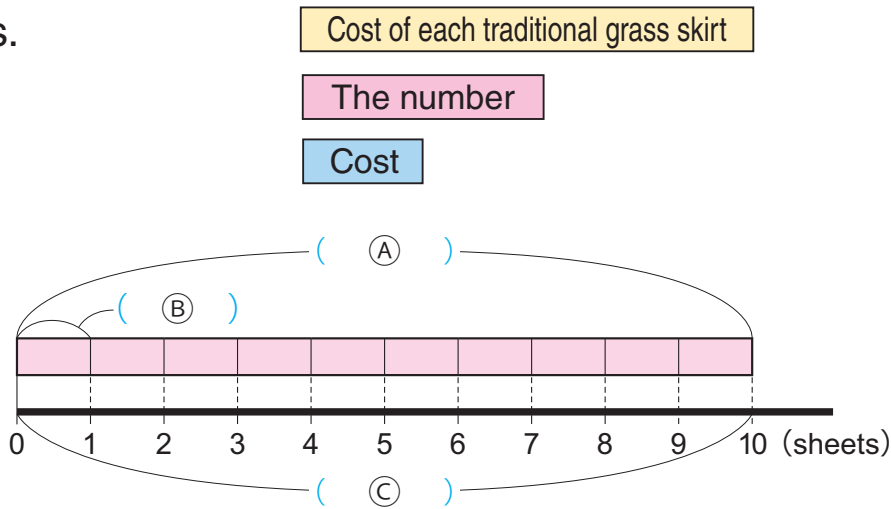
2

Math Sentences of Multiplication

1 Let's think about how to solve the following problem.

We bought 10 traditional grass skirts and paid 500 kina.
What is the cost of one traditional grass skirt?

1 Let's complete the diagram below by filling in the () with words.



2 Let's complete the mathematical sentence with words from the diagram.

$$\boxed{} \times \boxed{} = \boxed{}$$

3 Let's represent the unknown number in a mathematical sentence by using \square .

$$\boxed{} \times \boxed{} = \boxed{}$$

4 Let's think about how to find the number in the \square .



Put numbers in the \square in order.

Consider it using the diagram as same as the addition.





Ambai's idea

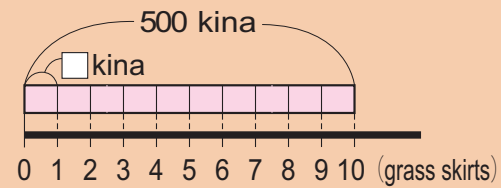
To find the number which fits $\square \times 10 = 500$, put numbers into \square .

- $10 \times 10 < 500$
- $20 \times 10 < 500$
- ...
- $50 \times 10 = 500$



Sare's idea

Consider how to use the diagram.



$$\square \times 10 = 500$$

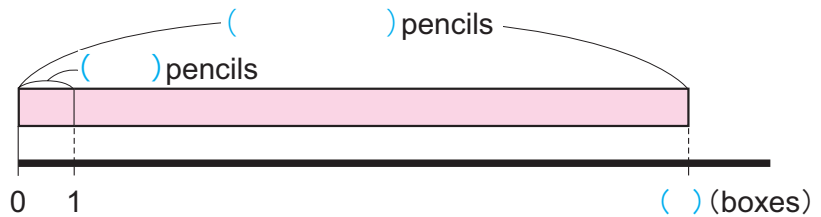
$$\square = 500 \div 10$$

$$\square = 50$$

2 You divide 66 pencils into 6 pencils to each box.

How many boxes of 6 pencils can you fill?

1 Let's draw the diagram by representing the unknown number by using \square .



2 Let's make mathematical sentences with words and by using \square .

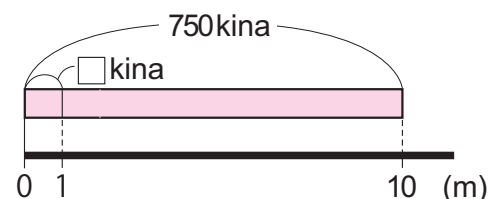
$$\square \times \text{Number of pencils in each box} = \square$$

$$\square \times \square = \square$$

3 Let's find the number which fits the \square by using various ways.

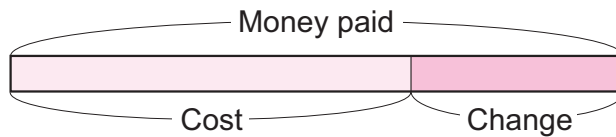
Exercise

The cost of 10 m tug rope for ship is 750 kina. Write a mathematical sentence by using \square to find the cost of 1 m tug rope.



1 Write a mathematical sentence with words to find the money paid.

● Writing the mathematical sentence with words.



$$\boxed{} + \boxed{} = \boxed{\text{Money paid}}$$

2 Children are sowing flower seeds. They sowed 240 flower seeds yesterday. Today, they sowed some seeds again. There are 500 seeds sown in total. Answer the following.

● Solving the problem using the \square .

① Using $\boxed{\text{Number of sowed seeds yesterday}}$, $\boxed{\text{Number of sowed seeds today}}$, $\boxed{\text{Total number}}$, write a mathematical sentence with words to find the total number.

② Let's change the unknown number in mathematical sentence by \square seeds.

③ Let's find the number by filling in the \square .

3 The cost of 10 L paint is 980 kina. Now, answer the following problem.

● Solving the problem using the \square .

① By using $\boxed{\text{volume of paint}}$, $\boxed{\text{Cost of 1 L paint}}$, $\boxed{\text{Cost}}$, let's write a mathematical sentence with words to find the cost.

② Let's change the unknown number in mathematical sentence by \square kina.

③ Let's find the number by filling in the \square .

4 Let's make a math story to write the following mathematical sentence and find the number by filling in the \square .

● Developing the problem for mathematical sentence.

① $\square + 50 = 1000$

② $\square \times 10 = 1000$

Using Money in Our Life



▶▶ Let's ask questions with friends.



What operation do we use?

I have kina in my pocket. Can I buy ... ? And how many? How much change will I receive?



How can we save money?

How can we reduce the number of coins in my pocket?



1 Price and Coins

1 Price and Coins

Let's read the following prices.



1 kina is written as K1.00 for the price. The price K3.95 is read as three-kina and ninety-five toea. The price 50 t is read just 50 toea. 1 kina is equal to 100 toea. Therefore, 3.95 kina is equal to 395 toea.

2 Let's read orally and fill in the box.

1 The price of one small coffee packet is 50t. It is toea.
It is one 50 toea coin. It is coins of 20 toea
and coin of 10 toea.

The price of two mini coffee packets is toea.
It is 1 kina.



2 The price of a bottle of water is K1.50. It is toea.

3 The price of a dozen for pencils is K3.99. It is toea.

 **Exercise**

Read the following price and arrange them in order.

1 Ice cream K2.00, Apple K1.50, Orange K2.60,
Chocolate K1.99 and Juice K2.95.

1. Arrange them from the highest price to the lowest.
2. Arrange them from the lowest price to the highest.

2 Arrange the following from lowest price.

Lolly 30 toea, Milk 2 kina, Chocolate 95 toea,
Snack 1 kina and Bubble Gum 5 toea.



Papua New Guinea Coins



5t 10t 20t 50t K1

There are 5 types of coins in Papua New Guinea. Discuss what kind of characteristics each coin has.

Example: 1 kina coin has a hole.
The size is getting bigger while the value increases.

Which Coin Do you use

3 James saved his money in the box for one year. Now, he has a number of every coin in his box and goes shopping.

- 1** For paying a small coffee packet of 50 toea, which coins should he use for paying and explain why?
- 2** Whose idea do you prefer?



Gawi's idea

Count by five






	5,		10,
	15,		20,
	25,		30,
	35,		40,
	45,		50

10 coins of 5 toea



Ambai's idea

coins of 10 toea are 5×10

	10
	20
	30
	40
	50 toea



Mero's idea

If we only use 20 toea coins, I use 3 coins of 20 toea and receive the change by 10 toea.
 $3 \times 20 = 60$



Yamo's idea

If I pay by a 1 kina coin, 50 toea subtract from 1 kina. The change is 50 toea. It is 2 coins of 20 toea and a 10 toea coin.



Vavi's idea

coins of 5 toea are 10×5 .

Which operation do you prefer?



To know the value of a number of the same currency, we use multiplication such as: **20 coins** of **five toea** is $20 \times 5 = 100$ toea. Its value is 1 kina. Five toea coin used as a unit for counting.

$$\text{(Number of the Coin)} \times \text{(Value of the Coin)} = \text{(Total Value)}$$



For using coins, we use the several conversions such as:

2 coins of 5 toea convert to a 10 toea coin.

4 coins of 5 toea convert to a 20 toea coin.

20 coins of 5 toea convert to a 1 kina coin.



How Much in Total

4 At a market, you find the prices in the table below.

- 1** Fill in the table.
- 2** When you buy a bottle of water and a coffee packet each, how much in total?

Item	Price	In Kina	In Toea
Bottle of water	K1.50	1.5 kina	
Coffee Packet	K0.50		
Dozen Pencil	K3.99		



$$1.50 + 0.50?$$

How can we add?

K1.5 means 1 kina and 50 toea and 0.50 kina means 50 toea, right?





Kekeni's idea

I calculated using vertical form.

$$1.5 + 0.5 = 2$$

$$\begin{array}{r}
 1.5 \\
 + 0.5 \\
 \hline
 2.0
 \end{array}$$

2 kina



Gawi's idea

If we represent them in toea:

K 1.5 is 150 toea

K 0.5 is 50 toea

$$\begin{array}{r}
 150 \\
 + 50 \\
 \hline
 200
 \end{array}$$

200 toea is 2 kina.

5

In 4, when you buy all three items, how much in total?

- 1 Let's find the total price in vertical form.
- 2 Which coins should you use and how much will be the change?

For using calculator, we write as follows.

$$\begin{array}{r}
 \text{K}1.50 \\
 0.50 \\
 + 3.99 \\
 \hline
 \end{array}$$

How do you type it in your calculator?

In shopping, we write the price in vertical form and find the total price by calculator. For payment, we usually show the money as for the same value of total price or more at first. When it is the same value, there is no change. When it is more, we must receive the change, exactly.



To know the value of change we use subtraction:

$$\text{(Given money)} - \text{(Price)} = \text{(Change)}$$

$$\text{For Confirmation: (Price) + (Change) = (Given money)}$$

6 How much in total? Write the prices in vertical form and find the answer.

Coke K2.00, Biscuit K1.50, Cream bun K2.60 and Chocolate K1.99.

7 I bought a bottle of water for 1.59 kina and I gave two coins of one-kina, and received 3 coins of 20 toea as for change. Is it correct? Explain with reason.



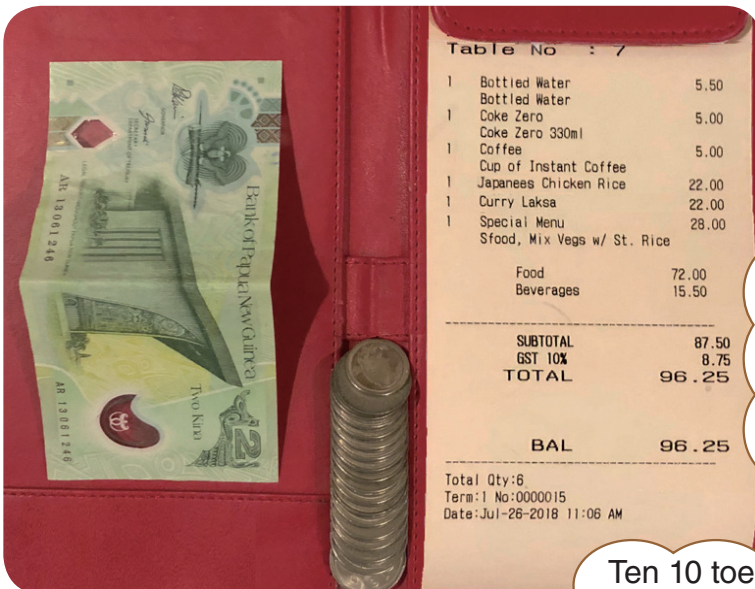
K1.59



In our country, some shops set the price which does not correspond to our money system. The price such as K0.99 cannot be paid by coins.

In the restaurant

Daily situation..



The total amount is K96.25. I think he paid K100.



The change is paid by one 2 kina note, seventeen 10 toea coins and one 5 toea coin.



Ten 10 toea coins can be changed to 1 kina coin and five 10 toea coins can be changed to 50 toea coin.



2 Unit for Currency

When we are not comfortable to pay by coins, we use notes as the currency. They are not heavy.

1 Price of one hand cream bottle is K5.50.

1 How many coins do we need for buying one bottle?

If 5 toea coin only:

If 10 toea coin only:

If 20 toea coin only:

If 1 kina coin only:

Which one will receive change?



2 How much is the cost for 50 bottles? Can we pay by coins?

2 In **1**, **1** if you use the following notes, below.

1 How would you pay and what will be the change?



A two-kina note is;
2 coins of 1 kina or
4 coins of 50 toea or
10 coins of 20 toea or
20 coins of 10 toea.

A five-kina note is; 5 coins of 1 kina, or
2 two-kina notes and one kina coin.

A five-kina note is 10 coins of 50 toea.

A ten-kina note is 10 coins of 1 kina coin.

A ten-kina note is 20 coins of 50 t or
2 notes of five-kina, or
five notes of two-kina .



Naiko's idea

I only use two-kina notes as follows:
 Two, four, six. 5.5 is larger than 4 and less than 6. Thus, pay 6 kina by three of two-kina note.
 $6 - 5.5 = 0.5$
 0.5 kina is fifty toea.



Yamo's idea

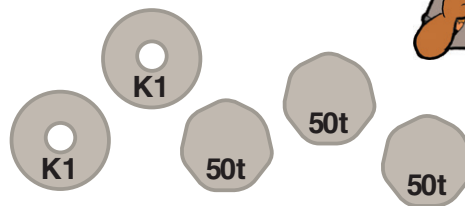
I use a ten-kina note because it is larger than 5.5 kina. The change is $10 - 5.5 = 4.5$.
 4.5 kina is 4 kina and 50 toea. It is 2 two-kina notes and one coin of 50 toea.



Sare's idea

I use a 5-kina note and 2-kina note. The change is
 $7 - 5.5 = 1.5$
 1.5 kina is 1 kina and 50 toea. It is one coin of one kina and 50 toea.

Who will receive the smallest amount of change?



2 In **1** **2**, if you use the notes, how would you pay and what will be the change?



Have you ever seen the following notes



A twenty-kina note is 20 coins of 1 kina, or 2 notes of ten-kina, or 4 notes of five-kina, or 10 notes of two-kina.

A fifty-kina note is 2 notes of twenty-kina and a ten-kina note.

A hundred-kina note is 100 coins of 1 kina, or 5 notes of twenty-kina, or 10 notes of ten-kina, or 20 notes of five-kina, or 50 notes of two-kina.

3 Fill in number in the boxes.

- 1 A two-kina note converts to coins of 20 toea.
- 2 A fifty-kina note is 2 notes of twenty-kina and note of ten-kina.
- 3 50 kina is note of twenty-kina and notes of five-kina.
- 4 84 kina is a fifty-kina note, a -kina note, a -kina note and two notes of two-kina.

4 When you buy one of the items in the photo below, how much is the change?

- 1 When you have a 100 kina note.
- 2 When you have 2 notes of 20 kina, 3 notes of 10 kina and 3 notes of 2 kina.



K25.00 means 25 kina.



Exercise

Solve the following mathematics expression.

- 1 $1.5 \text{ kina} + 2.5 \text{ kina}$
- 2 $2 \text{ kina} + 50 \text{ toea}$
- 3 $50 \text{ toea} + 90 \text{ toea}$
- 4 $2.5 \text{ kina} + 50 \text{ toea}$



Price Survey Project at Local Market

Prices of selling food at the local market changes depending on time in a day, season, and seller and so on. For price down, we do some negotiation.

Visit your local market with your parents and learn the price.

Name of foods	Price	Location

- ① Write the price of every food on the table in your local market and report it in the class.



- ② Choose the best survey in ① and develop shopping-calculation questions for using notes and coins and write it on a big chart to show it to your friends.
- ③ Present the questions and select the interesting questions as for the shopping.

Summary of Grade 3

1 Numbers and Calculations

1 Fill in the with a number or numeral.

9 12 16



1 The numeral in the hundred thousand place of 580000 is .

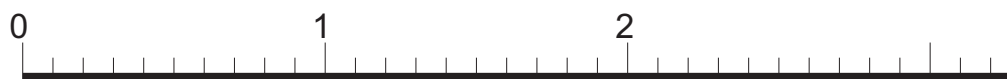
2 10 times 4300 equals and divide 4300 by 10 equals .

3 4 sets of $\frac{1}{7}$ is .

2 Let's represent the following numbers

by \downarrow on the number line.

$\frac{3}{10}$ $\frac{8}{10}$ 3



12 16



3 Let's fill in the with the equality or inequality sign.

1 32419 319972 **2** 301201 300498

9 12 16



3 $\frac{2}{7}$ $\frac{6}{7}$ **4** $\frac{3}{5}$ $\frac{2}{5}$

4 Let's calculate.

1 6 7 12 14 16



1 $7584 + 6439$ **2** $8204 - 3427$ **3** $8125 + 650 + 350$

4 30×70 **5** 67×48 **6** 870×32 **7** 508×50

8 $24 \div 3$

9 $56 \div 8$

10 $44 \div 7$

11 $39 \div 5$

12 $\frac{1}{7} + \frac{2}{7}$

13 $\frac{2}{3} - \frac{1}{3}$

14 $\frac{1}{5} + \frac{3}{5}$

15 $\frac{7}{9} - \frac{2}{9}$

5 There are 24 children who are going to receive 15 sheets of coloured paper each, how many sheets of coloured paper are needed?



6 Express the following problem using a multiplication with \square and find the answer.



There are 64 mangoes that are divided equally into 8 boxes. How many mangoes can be put in each box?

Multiplication Using Squares 56×82

		8
		2
5	6	

① Write 56 and 82 as shown above.

		8
		2
5	6	

② Draw diagonal line.

		8
		2
5	6	

③ Multiply each part.

		8
		2
5	6	

④ Add the numbers diagonally.

Answer

}

Ones place...

Tens place... $8 + 1 + 0 =$

Hundreds place... $4 + 0 + 1 =$

Thousands place...

2 How to Measure

1 Let's fill in the with a number.

4 10 15



1 1 km = m

2 2450 m = km m

3 1 minute = seconds

4 1 kg = g

5 148 seconds = minute seconds

6 3040 g = kg g

4



2 Let's find the duration of time.

1 What is the duration from 7:40 to 11:00 in the morning?

2 What is the time that is 1 hour and 30 minutes after 10:20 in the morning?

3 I enjoyed myself at the park for 1 hour and 10 minutes in the morning and later enjoyed 30 minutes in the afternoon.

Let's find the total time I enjoyed and the difference.

15



3 Measure the weight of two oranges.

What is the weight altogether?



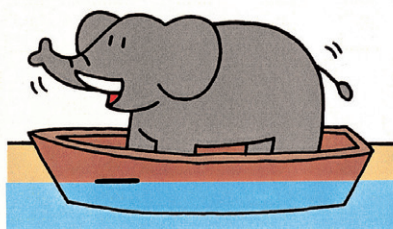
1st time



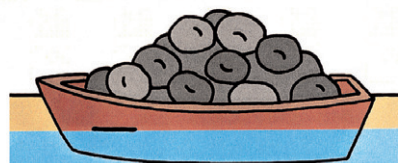
2nd time

Measure the Weight of an Elephant

In the old days, how did they measure the weight of an elephant?




Firstly, they put an elephant in the boat and drew a line to show how far the boat went down in the water.




Next, they put stones in the boat until it went down to the line. Then they measured the weight of stones to calculate the total weight.

3


Shape

1 What kind of shapes are the following figures? 9 11 

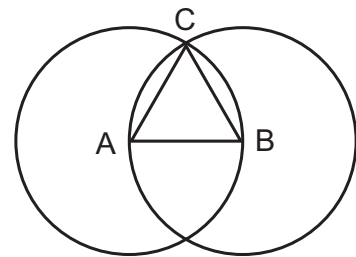
- 1 A round figure that is the same length from one point.
- 2 An object that looks a circle from any direction and like a ball.
- 3 A triangle with three equal sides.
- 4 A triangle with two equal sides.

2 Let's draw the following triangles. What kind of triangles is drawn? 11 

- 1 A triangle where 3 sides are 8 cm, 5 cm and 8 cm.
- 2 A triangle where 3 sides are 9 cm, 9 cm and 9 cm.

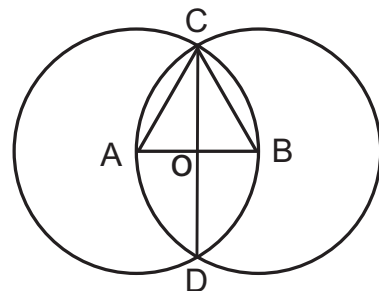
3 Let's draw two circle with a radius 4 cm and the centre points A and B. 8 11 

- 1 What kind of triangles is a triangle ABC?
- 2 How many centimetres are the sides of a triangle ABC?



How to Make a Right Angle

Draw the line CD, and measure the angle COB. This is the way to draw the right angle. Let's apply this method using a rope for drawing a right angle on the land.



4 Tables and Graphs

- 1 The table below shows the grades of children who were absent from school during the 5 days from March 1 to March 5.



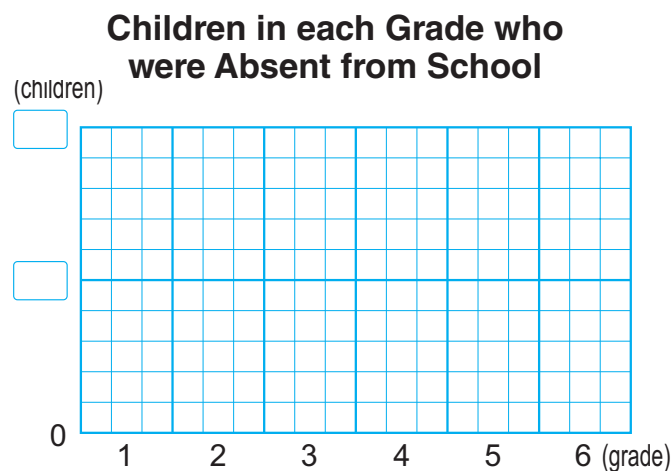
1 day	2 day	3 day	4 day	5 day
Grade 6	Grade 2	Grade 2	Grade 6	Grade 1
Grade 3	Grade 3	Grade 6	Grade 6	Grade 1
Grade 1	Grade 1	Grade 3	Grade 3	Grade 4
Grade 2	Grade 3	Grade 4	Grade 5	Grade 2
Grade 3	Grade 6	Grade 3		Grade 3
	Grade 4			

- 1 Let's write the number of children in each grade in the table below.

Children in each Grade who were Absent from School

Grade		1	2	3	4	5	6
Number of children	Using tally marks IIII-						
	Using number						

- 2 Draw a bar graph using the table.



- 3 What can you notice about the graph?

5

Using money

8 19



1 Let's read orally and fill in the box.

The price of one small coffee packet is 70 t. It is toea.

1 The change is one 1 kina and 30 toea. It is coins of 20 toea and coin of 10 toea.

2 The price of two mini coffee packets is toea.
It is 1 kina and 40 toea.

3 The price of a bottle of water is K1.00. It is toea.

4 The price of a dozen for pencils is K2.99. It is toea.

19



2 At the super market, you find the prices in the table below.

1 Fill in the table.

2 When you buy a water bottle and coffee packet, how much in total?

	Price	In Kina	In Toea
Bottle of water	K1.00	1.00 kina	
Coffee Packet	K1.20		
Dozen Pencil	K2.99		

3 Let's convert!



- 1 A two-kina note converts to coins of 50 toea.
- 2 A fifty-kina note is 3 notes of ten-kina and notes of two-kina.
- 3 100 kina is notes of twenty-kina and notes of five-kina.
- 4 100 kina is notes of ten-kina and note of fifty-kina.
- 5 19 kina is a ten-kina note and a -kina note and two note of -kina.
- 6 89 kina is a fifty-kina note and a -kina note and a -kina note and a -kina note and two notes of two-kina.

4 Sam bought a tray of chicken for 15.95 kina and received 4 kina and 5 toea as change. How much did he pay?



5 Lucial bought a packet of rice for 4.50 kina and tinned fish for 2 kina. She received a change of 4 kina. How much did she pay?



Answers

Chapter 2 Exercise: Page 40

- 1 ① 577 683 ③ 734 ④ 731 ⑤ 603 ⑥ 832
 ⑦ 333 ⑧ 236 ⑨ 177 ⑩ 296 ⑪ 357 ⑫ 237
- 2 ① 1596 ② 1534 ③ 1003 ④ 5562
 ⑤ 5850 ⑥ 10000 ⑦ 813 ⑧ 508
 ⑨ 563 ⑩ 2022 ⑪ 1408 ⑫ 5995
- 3 ① 5487 ② 3385
- 4 75 pages
- 5 Total: 4724 children. Boys are 12 more than girls.

Do you remember?: Page 40

- ① 18 ② 32 ③ 54 ④ 28 ⑤ 9 ⑥ 8 ⑦ 15 ⑧ 4

Chapter 2 Problems: Page 41

- 1 ① 588 ② 782 ③ 812 ④ 543 ⑤ 807
 ⑥ 1303 ⑦ 8614 ⑧ 4000 ⑨ 10000 ⑩ 551
 ⑪ 119 ⑫ 678 ⑬ 254 ⑭ 387 ⑮ 398
 ⑯ 508 ⑰ 2291 ⑱ 8219
- 2 ① Cathy's sister has 891kina more savings.
 ② 8083 kina is their total savings.

3

$$\begin{array}{r} 294 \\ + 119 \\ \hline 413 \end{array}$$

$$\begin{array}{r} 437 \\ - 198 \\ \hline 239 \end{array}$$

Chapter 4 Exercise: Page 58

- 1 ① 0 ② 0 ③ 0 ④ 0 ⑤ 40
 ⑥ 70 ⑦ 80 ⑧ 70 ⑨ 24 ⑩ 40 ⑪ 90
- 2 ① 3 ② 6 ③ 7 ④ 4 ⑤ 3 ⑥ 8
- 3
- $$\begin{array}{l} 8 \times 7 \left\{ \begin{array}{l} 8 \times 3 = 24 \\ 8 \times 4 = 32 \\ \hline \text{In total } 56 \end{array} \right. \end{array}$$
- $$\begin{array}{l} 9 \times 6 \left\{ \begin{array}{l} 9 \times 6 = 54 \\ 9 \times 0 = 0 \\ \hline \text{In total } 54 \end{array} \right. \end{array}$$

Do you remember?: Page 58

See teacher.

Chapter 4 Problems: Page 59

- 1 ① 0 ② 0 ③ 6 ④ 3 ⑤ 4
- 2 ① 0 ② 0 ③ 0 ④ 20
 ⑤ 60 ⑥ 20 ⑦ 24 ⑧ 90

3

Points on card	0	2	5	10	Total
Number of cards obtained	3	0	4	3	10
Total points	0	0	20	30	50

- 4 90 capsules

Chapter 6 Exercise: Page 67

- 1 ① 60 ② 80 ③ 3
- 2 6 minutes 8 seconds
- 3 1 hour 55 minutes
- 4 1 hour 40 minutes
- 5 9 hours 45 minutes

Do you remember?: Page 67

- ① 0 ② 0 ③ 0 ④ 0 ⑤ 70 ⑥ 50 ⑦ 30 ⑧ 60

Chapter 6 Problems: Page 68

- 1 1) 1 day 2) 15 hours 3) 3 hours 45 minutes
 4) 60 minutes 5) 75 seconds
- 2 ① 180 ② 100
 ③ 2, 5 ④ 33, 20
- 3 ① minutes ② seconds ③ hours
- 4 10:40

Chapter 7 Exercise: Page 73

- 1 ① 45 ② 96 ③ 94 ④ 72
 ⑤ 252 ⑥ 441 ⑦ 232 ⑧ 666
 ⑨ 304 ⑩ 210 ⑪ 320 ⑫ 3000
- 2 220 kina
- 3 I LOVE MATHS

Chapter 7 Exercise: Page 77

- 1 ① 99 ② 608 ③ 301 ④ 224 ⑤ 145
 ⑥ 564 ⑦ 648 ⑧ 1524 ⑨ 2415 ⑩ 1008
 ⑪ 3689 ⑫ 5104
- 2 7, 7
- 3 750 kina
- 4 1360 meters

Do you remember?: Page 77

- ① 8 ② 3 ③ 3 ④ 5 ⑤ 3 ⑥ 8

Chapter 7 Problems: Page 78

- 1 Total 2688,
 ($7 \times 4 = 28$, $7 \times 80 = 560$, $7 \times 300 = 2100$)
- 2 ① 150 ② 900 ③ 4200 ④ 88 ⑤ 270
 ⑥ 512 ⑦ 669 ⑧ 2653 ⑨ 2920
- 3 ① 255 ② 1104 ③ 1008
- 4 1080 kina

Chapter 7 Problems: Page 79

- ① ① 540 kina
 ② ① $87 \times 9 = 783$ ② $98 \times 1 = 98$ and $492 = 98$
 ③ $A = 1$, $B = 5$ and $C = 7$

Chapter 8 Exercise: Page 91

- ① ① 5 ② 8 ③ 3 ④ 7 ⑤ 4 ⑥ 7 ⑦ 5 ⑧ 6
 ⑨ 8 ⑩ 6 ⑪ 4 ⑫ 8 ⑬ 9 ⑭ 9 ⑮ 7 ⑯ 4
 ⑰ 1 ⑱ 0 ⑲ 23 ⑳ 21
 ② ① 3 ② 5 ③ 8 ④ 4 ⑤ 7 ⑥ 3 ⑦ 8 ⑧ 6
 ③ ① 7 friends ② 7 cookies

Do you remember?: Page 91

- ① 144 ② 504 ③ 448 ④ 310
 ⑤ 852 ⑥ 4501 ⑦ 1854 ⑧ 8991

Chapter 8 Problems: Page 92

- ① ① 4 sheets ② 4 children
 ② ① 9 ② 5 ③ 9 ④ 7 ⑤ 9 ⑥ 4 ⑦ 3 ⑧ 7
 ⑨ 3 ⑩ 7 ⑪ 4 ⑫ 7 ⑬ 4 ⑭ 6 ⑮ 9 ⑯ 7
 ⑰ 1 ⑱ 0 ⑲ 2 ⑳ 1
 ③ ① There are 32 pencils distributed to 4 friends equally. How many pencils can each friend receive?
 ② There are 32 pencils. 4 pencils are distributed to each friend.
 How many friends can receive?

Chapter 9 Exercise: Page 97

- ① ① 9 remainder 2 ② 7 remainder 1
 ③ 2 remainder 5 ④ 4 remainder 7
 ⑤ 4 remainder 6 ⑥ 6 remainder 7
 ② 6 pencils and a remainder of 6
 ③ 7 cards and a remainder of 3
 ④ 8 plastic bags

Do you remember?: Page 97

- ① 307 ② 328 ③ 164 ④ 267 ⑤ 539
 ⑥ 247 ⑦ 2189 ⑧ 2332 ⑨ 979

Chapter 9 Problems: Page 98

- ① 9 remainder 1, 7 remainder 2
 ② ① 7 tomatoes remainder 4, ② 2 tomatoes
 ③ ① 4 remainder 1 ② 9 remainder 3
 ③ 4 remainder 1 ④ 3 remainder 5
 ⑤ 6 remainder 2 ⑥ 6 remainder 5
 ⑦ 5 remainder 1 ⑧ 5 remainder 4
 ⑨ 8 remainder 2
 ④ Total 15 L, 15 divided by 3 equals 5, 5 L per child.
 1. 2 bottles of 2L and 1 bottle of 1L, 2 bottles of 2L and 1 bottle of 1L and 5 bottles of 1L.
 2. 1 bottle of 2L and 3 bottles of 1L, 1 bottle of 2L and 3 bottles of 1L, 1 bottle of 2L and 3 bottles of 1L.

Chapter 10 Exercise: Page 107

- ① ① (a) Centre ② (b) Radius (c) Diameter
 ② ① Diameter ② 2
 ③ See teacher
 ④ Compare the lengths using a compass.
 Longest-C and Shortest-B

Do you remember?: Page 107

- ① 1 ② 100
 ③ 100 ④ 2

Chapter 10 Problems: Page 108

- ① See teacher
 ② Radius is 2cm. Length of 1 side of square is same as diameter
 ③ Square
 ④ 16cm

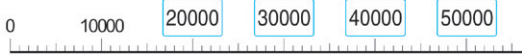
Chapter 11 Exercise: Page 121

- ① ① 20180 ② 763000 ③ 305000
 ② ① 11500, 13000, 13500 ② 324, 326, 330
 ③ ① a) 180000 b) 320000 c) 490000
 ② d) 545000 e) 553000 f) 567000
 ④ ① > ② >
 ⑤ ① 230 ② 400 ③ 1110 ④ 6050
 ⑥ ① 13080 ② 14040 ③ 1991

Chapter 11 Problems: Page 122

- 1 ① 480270 ② 509200 ③ 235000 ④ 1000000

2



- 3 ① 19900 ② 20000 ③ 200000, 150000

Chapter 12 Exercise: Page 131

- 1 ① Distance ② Road distance ③ 1000 m

- 2 a) 10m 5cm b) 10m 48cm c) 10m 93cm

- d) 7m 7cm e) 7m 56cm f) 8m 19cm

- 3 ① 1220m ② 240m

Do you remember?: Page 131

- ① 11:25 ② 2 hours

Chapter 12 Problems: Page 132

- 1 ① 8m ② 4km ③ 60cm ④ 4509m

- 2 ① 16m 84cm ② 16m 99cm ③ 17m 6cm

- ④ 17m 18cm ⑤ 17m 23cm

- 3 ① 2km 50m ② 1580m ③ 5km

- 4 ① 1200m ② 2km 100m ③ 6km 80m

- ④ 700m ⑤ 1km 700m ⑥ 2km 990m

- 5 Through Hona's house. By 20m

Chapter 13 Exercise: Page 143

- 1 a), c) and e) are Equilateral Triangles

- b) & d) are Isosceles Triangles.

- 2 a) Isosceles Triangle b) Equilateral Triangle

- 3 See teacher.

Do you remember?: Page 143

- ① 20 & 200 ② 400 & 4000

- ③ 780 & 7800 ④ 910 & 9100

Chapter 13 Problems: Page 144

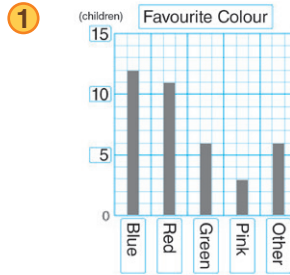
- 1 ① two, two ② three, three

- 2 See teacher

- 3 ① DAC and CBE are isosceles.

- ② CAB is formed by the radius of the two circles. They are of the same length.

Chapter 14 Exercise: Page 155



- 2 A) 1 B) 4 C) 3 D) 11 E) 4

- F) 4 G) 15 H) 58

Chapter 14 Problems: Page 156

- 1 ① 20 cans ② 80, 280, 200. Total: 1080

- ③ See teacher ④ a) Bar Graph b) Table

- 2 See teacher.

Chapter 15 Exercise: Page 164

- 1 ① 100 ② 1800 ③ 2000 ④ 308 ⑤ 589

- ⑥ 756 ⑦ 1548 ⑧ 3886 ⑨ 3431 ⑩ 2100

- ⑪ 2880 ⑫ 2760

- 2 2550 minutes

- 3 ①
$$\begin{array}{r} 54 \\ \times 94 \\ \hline 216 \\ 486 \\ \hline 5076 \end{array}$$

②
$$\begin{array}{r} 408 \\ \times 65 \\ \hline 2040 \\ 2448 \\ \hline 26520 \end{array}$$

Chapter 15 Problems: Page 165

- 1 ① 60 ② 45, 3 ③ 45, 60, 10

- 2 ①
$$\begin{array}{r} 54 \\ \times 94 \\ \hline 216 \\ 486 \\ \hline 5076 \end{array}$$

②
$$\begin{array}{r} 408 \\ \times 65 \\ \hline 2040 \\ 2448 \\ \hline 26520 \end{array}$$

- 3 1634 papers

- 4 ① A1, B5 ② A6, B5

- C3, D1 C2, D8

- E6

Chapter 16 Exercise: Page 176

- 1 ① 3kg, 3000g ② 5L, 5kg,

- ③ ① 20g ② 10g ③ 50g

- 3 A) 1kg400g, 1400g B) 2kg700g, 2700g

- C) 6kg800g, 6800g

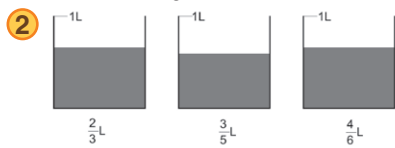


Do you remember: Page 176

- ① 5460 ② 5040 ③ 19194 ④ 14630

Chapter 17 Exercise: Page 184

1 ① 3 ② $\frac{5}{6}$ ③ 3 ④ 1



3 ① > ② < ③ >

4 ① 1 ② $\frac{6}{8}$ ③ $\frac{1}{6}$ ④ $\frac{2}{3}$

Do you remember?: Page 184

① 4 ② 5 ③ 9 ④ 0 ⑤ 2 remainder 2

⑥ 4 remainder 4 ⑦ 7 remainder 3

⑧ 8 remainder 2

Chapter 17 Problems: Page 185

1 ① $\frac{4}{6}$ simplified to $\frac{2}{3}$

2 ① $\frac{3}{4}$ ② 4 ③ $\frac{1}{10}$ ④ 4

3 Possible answers: $\frac{2}{8} + \frac{5}{8}$

4 ① $\frac{1}{5}$ ② $\frac{5}{5}$ ③ $\frac{1}{5}, \frac{2}{5}, \frac{3}{5}$ ④ $\frac{4}{5}$

Chapter 18 Problems: Page 192

1 Cost + Change = Money paid

2 ① No. of seeds yesterday + No. of seeds today = Total number

② $240 + \square = 500$

③ $500 - 240 = 260$, therefore, $240 + 260 = 500$ (seeds).

3 ① Volume of paint \times Cost of 1L pint = Cost

② $10 \times \square = 980$

③ $980 \div 10 = 98$, therefore, $10 \times 98 = 980$ (kina).

4 ① $\square = 950$

② $\square = 100$

Glossary

Addend is the number to be added.	5
Angle is a figure formed by 2 straight lines from one point.	140
Augend is the number we add with.	5
Bar graph is a graph which represents the various amounts by the length of bars.	147
Convert is changing from one money or unit to another.	196
Denominator number below the fraction bar that represents the number of equal parts the whole is divided into.	180
Diameter is Is a straight line drawn from one point on the circle to the other point on the circle passing through the centre of the cicle.	102
Distance is the length between 2 places along a straight line.	124
Dividend is the number to be divided.	88
Divisible is when the dividend is divisible by the divisor, having no remainder.	94
Divisor is the number we divide.	88
Equal Sign: “ = ” is called the equal sign. The symbol is not only used for writing the answer of the calculation, but also used for showing that the expressions or numbers on the left hand side and the right hand side are equal.	50
Equilateral triangle is a triangle with three sides and three angles equal.	137
Fractions is a number that represents part of a whole such as $\frac{1}{3}$, $\frac{3}{4}$, etc.	180
Gram is a unit used to measure weight. 1 gram is written as 1g.	169
Hundred thousand is the number that is10 sets of ten thousand and written as 100 000 or 100 thousand.	112
Inequality signs are symbols using to compare different quantities. < and > are symbols used to compare two numbers, whether one number is larger or smaller than the other number.	115
Isosceles triangle is a triangle with two sides and two angles equal. . . .	136

Kilogram is a unit of weight. 1000 g is called 1 kilogram and written as 1 kg.	171
Minuend is the number we subtract from.	8
Multiplicand is the number to be multiplied.	49
Multiplier is the number we multiply.	49
Not divisible is when the dividend is not divisible by the divisor, having remainder.	94
Number line is a straight line, with marked points that are equally spaced where in every point on the line corresponds to a number.	114
Numerator is the number above the bar that represents the number of collected parts.	180
One million is the number that is 10 sets of hundred thousand and written as 1 000 000 or one million.	113
One kilometer is 1000 meter and is written as 1km.	127
Road distance is the length measured along the road.	127
Seconds are time units shorter than 1 minute.	63
Size of angle is the the amount of opening between both sides of an angle.	140
Sphere is an object that looks like a circle from any direction.	105
Subtrahend is the number to be subtracted.	8
T-Math is Table Math.	5
Ten thousand is the number that is 10 sets of one thousand and written as 10 000 or 10 thousand.	110
Thousand is the sum of 10 sets of 100 and is written as 1000.	15

National Mathematics Grade 3 Textbook Development Committee

The National Mathematics Textbook was developed by Curriculum Development Division (CDD), Department of Education in partnership with Japan International Cooperation Agency (JICA) through the Project for Improving the Quality of Mathematics and Science Education (QUIS-ME Project). The following stakeholders have contributed to manage, write, validate and make quality assurance for developing quality Textbook and Teacher's Manual for students and teachers of Papua New Guinea.

Joint Coordinating Committee members for QUIS-ME Project

Dr. Uke Kombra, Secretary for Education - Chairperson, Mr. Walipe Wingi, Deputy Secretary - Deputy Chairperson, Mr. Baran Sori, Mr. Samson Wangihomie, Mr. Titus Romano Hatagen, Dr. Eliakim Apelis, Mr. Godfrey Yerua, Mrs. Annemarie Kona, Mr. Camilus Kanau, Mr. Joseph Moide, Mr. Peter Kants, Mr. Maxton Essy, Mr. Steven Tandale, Ms. Hatsie Mirou, Mr. Paul Ainui, Mr. Packiam Arulappan, Mr. Allen Jim, Mr. Nopa Raki, Mr. Gandhi Lavaki, Mr. John Kakas, Ms. Philippa Darius, Mr. Alex Magun, Ms. Mary Norrie, Mr. James Namari, Ms. Kila Tau, Mr. Moses Hatagen Koran, Ms. Colette Modagai, Ms. Dorothy Marang, Mr. Dan Lyanda, Representatives from Embassy of Japan and JICA PNG Office, Mr. Akinori Ito, MPS, Mr. Chiko Yamaoka and other Project Experts

Steering Committee members for QUIS-ME Project

Mrs. Annemarie Kona, First Assistant Secretary - Chairperson, Mr. Steven Tandale - Assistant Secretary, CDD - Deputy, Chairperson, Ms. Hatsie Mirou, Mr. Paul Ainui, Mr. Gandhi Lavaki, Mr. John Kakas, Ms. Philippa Darius, Mr. Alex Magun, Ms. Mary Norrie, Mr. James Namari, Ms. Kila Tau, Mr. Moses Hatagen Koran, Ms. Mary Phillips, Mr. Nopa Raki, Mr. Geoff Gibaru, Ms. Jean Taviri, Mr. Akinori Ito, MPS, Mr. Chiko Yamaoka, Mr. Satoshi Kusaka, Mr. Ryuihi Sugiyama, Mr. Kenichi Jibutsu, Ms. Masako Tsuzuki, Dr. Kotaro Kijima, Ms. Kyoko Yamada and Representatives from Textbook writers and JICA PNG Office

Curriculum Panel

Mr. Steven Tandale, Mr. Gandhi Lavaki, Ms. Philippa Darius, Mr. Alex Magun, Mr. John Kakas, Ms. Mirou Avosa, Ms. Mary Norrie, Mr. Gilbert Ikupu, Mr. John Wek, Ms. Betty Bannah, Mr. Vitus Witnes, Ms. Clemencia Dimain and Ms. Celine Vavetaovi

Editorial Supervisors

Prof / Dr. Masami Isoda, Mr. Satoshi Kusaka, Mr. Katsuaki Serizawa and Mr. Akinori Ito, MPS

Content Supervisors

Ms. Kyoko Yamada, Prof. Hiroki Ishizaka, Prof. Yoichi Maeda and Prof. Takeshi Sakai

Writers & Proofreaders (Curriculum Officers & Textbook writers - Math working Group)

Ms. Mary Norrie - Math Working Group Leader, Mr. James Namari, Ms. Kila Tau, Mr. Anda Apule, Ms. Pisah Thomas, Ms. Michelle Pala, Ms. Ileen Palan, Ms. Hilda Tapungu, Mr. Armstrong Rupa and Mr. Gibson Jack

Chief Proofreader, Illustrators, Photos & Desktop Publishing

Mr. Alex Magun (Chief Proofreader), Mr. Micheal John (Illustrator), Mr. David Gerega, Mr. Vitus Witnes (Graphic designers), Mr. Armstrong Rupa, Mr. Gibson Jack, Mr. Satoshi Kusaka, Ms. Yoshiko Osawa, Ms. Michiyo Ueda (Desktop Publishing), Mr. Chiko Yamaoka (Photographer) and Gakko Toshō Co.,Ltd. (Photos and illustrations)

Validation Team (Math working group & Teachers from pilot schools)

Ms. Aiva Koia, Ms. Aloisia Charles, Ms. Anne Auhava, Ms. Glenda Blasius, Ms. Idau Rea, Ms. Jacklyn Kerowa, Mrs. Johanne Wambriwari, Mr. John Otai, Ms. Lee Kalinoe, Ms. Linda Wami, Ms. Marcia Pau, Ms. Serah Robinson, Ms. Sheila Sabarei, Ms. Susie Pet, Ms. Sussie Kipak and Mrs. Theresa Paisoi, Ms. Fredah Bonifas

Cooperation

Japan International Cooperation Agency (JICA), Department of National Planning & Monitoring (DNPM), Bank of Papua New Guinea, Centre for Research on International Cooperation in Education Development (CRICED) - University of Tsukuba, Naruto University of Education, Gakko Toshō Co.,Ltd., Gaire Primary School, Iobuna Kouba Primary School, Koki Primary School, Koiari Park Primary School, St. John Primary School, St. Peter Primary School, St. Therese Primary School, Sogeri Primary School, Tubuseria Primary School and Wardstrip Primary School.



