National MATHEMATICS Textbook

Grade 5

Papua New Guinea
Department of Education

From
the People of Japan

'FREE ISSUE
NOT FOR SALE'

Issued free to schools by the Department of Education

First Edition

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Acknowledgements

The Grade 5 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** 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.

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National Mathematics Textbook

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JICA

QUIS-ME
We love Maths and Science!
Department of Education & JICA

Minister's Message

Dear Grade 5 Students,

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

The Government of Papua New Guinea through The Department of Education has been working to improve students' learning of Mathematics. This textbook was developed by our dedicated Curriculum Officers, Textbook Writers and Pilot Teachers, who have worked collaboratively with Japanese Math specialists for three years. This is the best textbook for grade 5 students in Papua New Guinea and is comparable to international standards. In its development I would like to thank the Government of Japan for its support in improving the quality of learning for the children of Papua New Guinea.

I am excited about this textbook because it covers all topics necessary for learning in grade 5. 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 and enjoyable 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. Joseph Yopyyopy, MP

Minister of Education

Message from the Amassador of Japan

Greetings to Grade 5 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

Mathematics

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 5. 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 that will allow you to learn with your teacher or on your own as an independent learner. The 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.

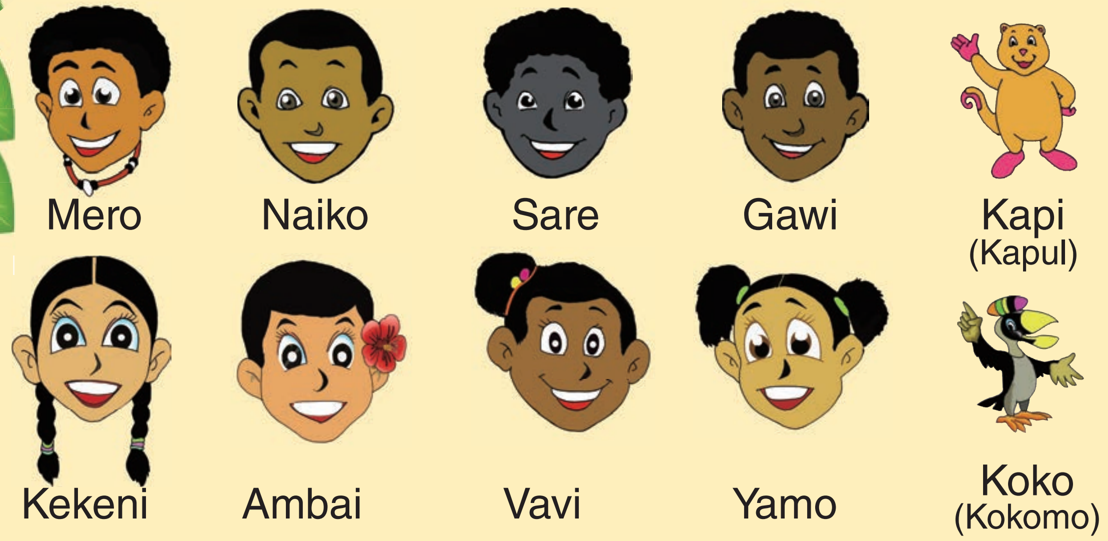
You are encouraged to be like a young Mathematician who learns and is competent in solving problems and issues that are happening in the world today. You are also encouraged to practice what you learn everyday both in school and at home with your family and friends.

I commend this Grade 5 National Mathematics Textbook as the official textbook for all Grade 5 students for their Mathematics lessons throughout Papua New Guinea.

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



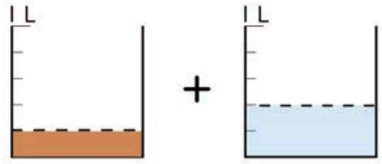
Symbols in this textbook

- Ice breaking activity as the lead up activity for the chapter.
- 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.
- Exercise: Let's do the exercise.
- Activity: 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.

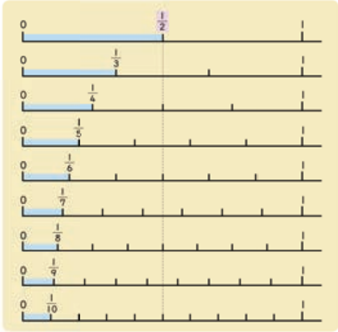
What We Learned in Grade 4

The sum of 1 L and $\frac{1}{3}$ L is written as $1\frac{1}{3}$ L and is read as "one and one third litres".
It is also written as $\frac{4}{3}$ L and is read as "four thirds litres" or "four over three litres".

$$1\frac{1}{3} = \frac{4}{3}$$

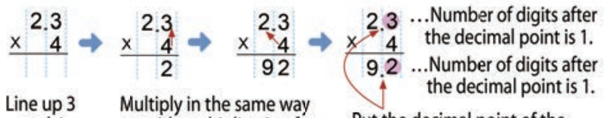


$\frac{1}{5} + \frac{2}{5} =$



Decimal Numbers

How to Multiply 2.3×4 in Vertical Form

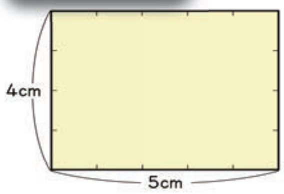


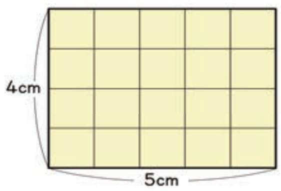
Line up 3 and 4.

Multiply in the same way as with multiplication for whole numbers.

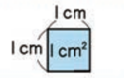
Put the decimal point of the product in the same place as the decimal of the multiplicand.

Area





The area of a square with 1 cm sides is called **one square centimetre** and is written as 1 cm^2. The unit cm^2 is a unit of area.

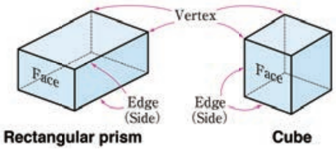


1 cm^2

The area of any rectangle is expressed as
Area of a rectangle = length × width.
This mathematical sentence like this is called a **formula**.
The area of a rectangle is also expressed as **width × length.**

Rectangular Prisms & Cubes

A shape covered only by rectangles or by squares and rectangles is called **rectangular prism**.
A shape covered only by squares is called **cube.**



A flat face like the faces of a rectangular prism and cube is called plane.

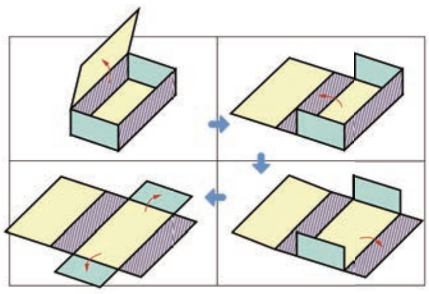


Table of Contents

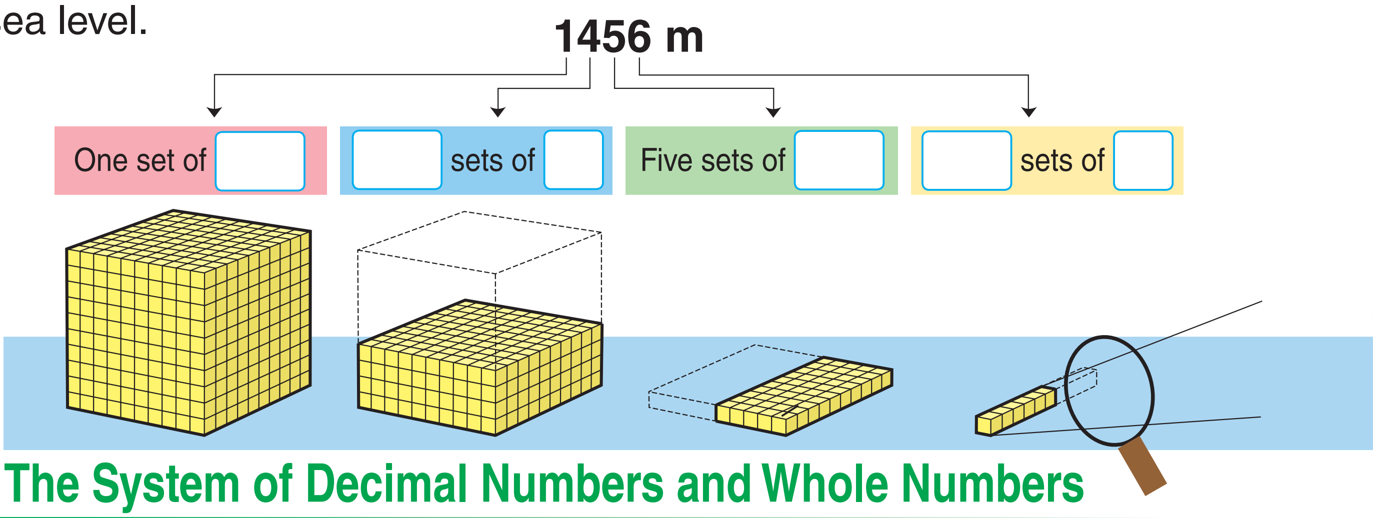
Number and Operation

Geometric Figures

1 Decimal Numbers and Whole Numbers

Simbu Province

▶▶ The altitude of Kundiawa town is 1456 m above sea level.



1 The System of Decimal Numbers and Whole Numbers

1 Let's compare the two numbers in the pictures, 1456 and 1.456

① Fill the ☐ with set of numbers as above.

② Look at the pictures of the blocks and discuss what you have noticed with your friends.

③ Express each number by the expressions as shown below.

$1456 = 1000 + 400 + 50 + 6$

$= 1000 \times \square + 100 \times \square + 10 \times \square + 1 \times \square$

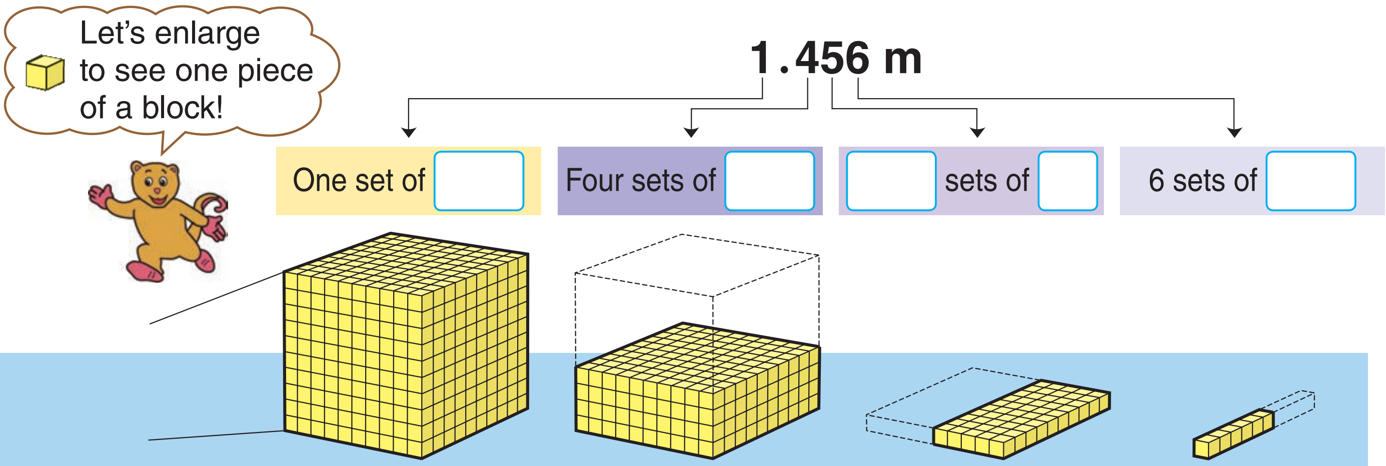
$1.456 = 1 + 0.4 + 0.05 + 0.006$

$= 1 \times \square + 0.1 \times \square + 0.01 \times \square + 0.001 \times \square$

We can say that 1.456 is made up from ☐ set of 1, ☐ sets of $\frac{1}{10}$, ☐ sets of $\frac{1}{100}$ and ☐ sets of $\frac{1}{1000}$.

Ambai

▶▶ The length of the laplap (material) is 1.456 m.

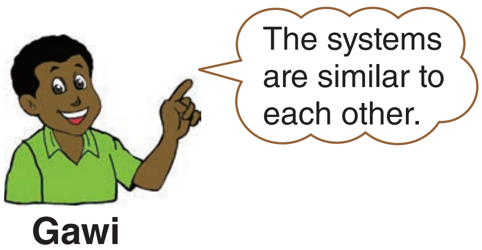


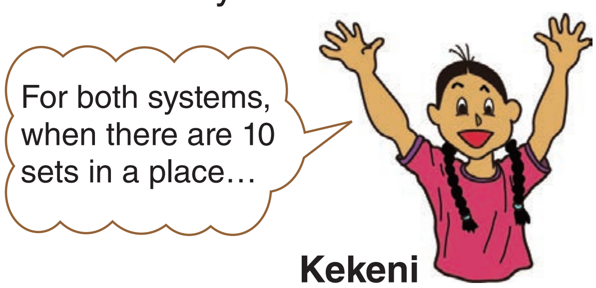
4 Write each number in the table below.

Place Value Table

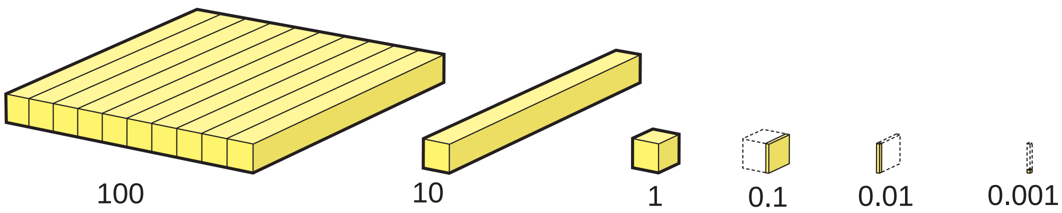
					$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	
	Thousands	Hundreds	Tens	Ones.	Tenths	Hundredths	Thousandths	
Altitude of Kundiawa								m
Length of laplap								m

5 Compare the systems of decimal numbers and whole numbers and discuss what you have noticed with your friends.





2 Let's think about the system of numbers.



1. For whole numbers, how many numbers are needed in a place for it to shift to the next higher place? Also, how many equal parts must a number be divided for it to shift to the next lower place?
2. For decimal numbers, how many numbers are needed in a place for it to shift to the next higher place? Also, how many equal parts must a number be divided for it to shift to the next lower place?

For both whole and decimal numbers, a number is shifted to the next higher places when multiplied by 10 in every place and a number is shifted to the next lower places when it is divided by 10 (multiplied by $\frac{1}{10}$). This is the basic idea of the place value system.
By using the place value system, any whole or decimal number can be expressed using the ten digits 0, 1, 2, …, 9 and a decimal point.

3 Let's compare the calculations 132 + 47 and 1.32 + 4.7

132 + 47 is a calcualtion of whole numbers in vertical form as shown below.

```
  132
+  47
```

Similarly, 1.32 + 4.7 can be calculated in vertical form.

```
  1.3 2
+   4.7
```

Yamo

I think, this calculation is wrong. Because...

Mero

What do you think of Yamo's way of calculating?
Explain your opinions to your friends.

Exercise

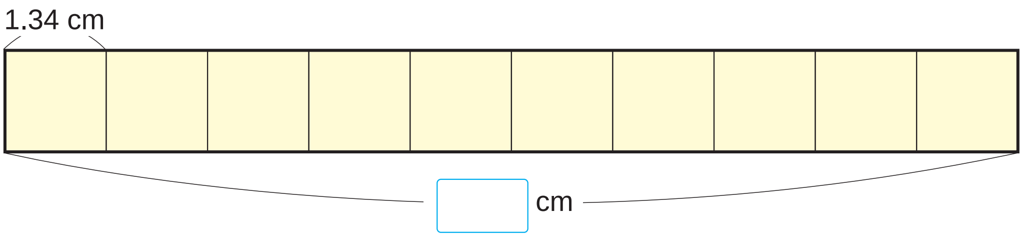
Let's make numbers using the ten digits from 0 to 9 once each time and a decimal point.

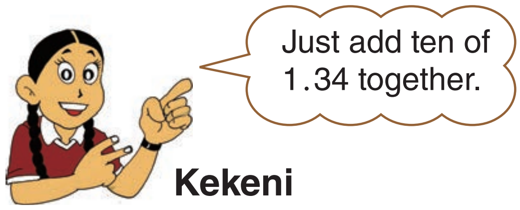
Write the smallest number. Write a number that is smaller than 1 and is nearest to 1.

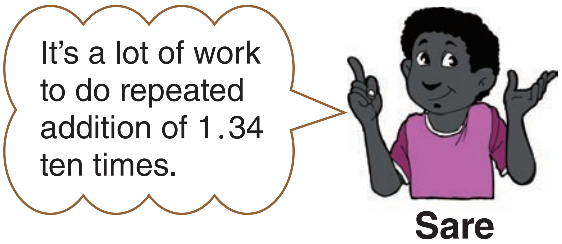
10 Times and 100 Times of a Number

4 Let's consider numbers multiplied by 10 and 100.

① There are 10 stickers, each one is 1.34 cm wide and are lined up as shown below. How many centimetres (cm) is the total length?





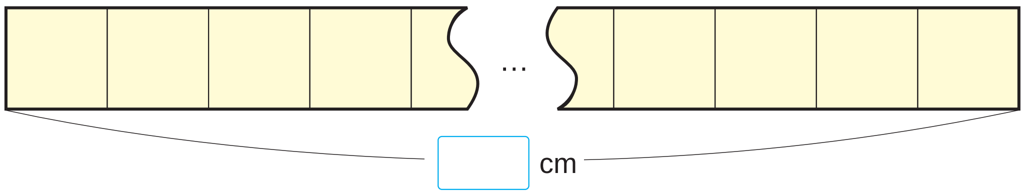


Vavi's Idea

It is ten times of 1.34, so we can solve it by doing $1.34 \times 10 = \square$.

$$\begin{array}{r} 1.34 \\ \times \quad 10 \\ \hline \end{array}$$

② There are 100 stickers, each one is 1.34 cm wide and are lined up. How many cm is the total length?



❸ Write the total lengths when there are 10 stickers and 100 stickers in the table below.

Hundreds	Tens	Ones	Tenths ($\frac{1}{10}$)	Hundredths ($\frac{1}{100}$)
		1	3	4

times 10 — 10 times of 1.34

times 10 — 100 times of 1.34

×10

×100

❹ What rules are there?

❺ Write in the decimal points when 1.34 is multiplied by 10 and 100.

1 . 3 4

1 □ 3 □ 4 □ (×10)

1 □ 3 □ 4 □ (×100)

If a number is multiplied by 10, the decimal point moves 1 place to the right.
If a number is multiplied by 100, the decimal point moves to 2 places to the right.

Exercise

Let's answer the following questions.

① Write the numbers when 23.47 is multiplied by 10 and 100.

② How many times of 8.72 are 87.2 and 872?

$\frac{1}{10}$ and $\frac{1}{100}$ of a Number

5 Let's consider the numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of a number.

① Calculate $\frac{1}{10}$ and $\frac{1}{100}$ of 296 and write the answers in the table below.

$\frac{1}{10}$ of 296 is as follows:
$\frac{1}{10}$ of 200 is 20
$\frac{1}{10}$ of 90 is 9
$\frac{1}{10}$ of 6 is 0.6
$20+9+0.6=29.6$
then, $\frac{1}{10}$ of 296 is 29.6

	Hundreds	Tens	Ones	$\frac{1}{10}$	$\frac{1}{100}$
	2	9	6		
$\frac{1}{10}$ of 296 → $\frac{1}{10}$					
$\frac{1}{100}$ of 296 → $\frac{1}{10}$					

(Arrows beside the table: $\frac{1}{10}$ from the first row to the second row; $\frac{1}{100}$ from the first row to the third row.)

② What rules are there?

③ Write the decimal points of numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of 296 in the □ below.

2 9 6

$\frac{1}{10}$ → 2 □ 9 □ 6 □ ($\frac{1}{10}$)

$\frac{1}{10}$ → 2 □ 9 □ 6 □ ($\frac{1}{100}$)

$\frac{1}{10}$ of a number moves the decimal point 1 place to the left.

$\frac{1}{100}$ of a number moves the decimal point 2 places to the left.

Exercise

Let's answer the following questions.

① Write the numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of 30.84

② What are 6.32 and 0.632 as a multiple of 63.2?

EXERCISE

1 Let's fill the □ with numbers. Page 2

① 86.1 = □ × 8 + □ × 6 + □ × 1

② 0.0072 = □ × 7 + □ × 2

2 Let's summarise the common features with both decimal numbers and whole numbers. Page 4

① For both whole numbers and decimal numbers, when there are □ sets of a number, it is shifted one place higher.
When a number is divided into □ parts, it is shifted one place lower. Whole and decimal numbers are both, based on the place value system.

② Any whole or decimal number can be expressed by using the □ digits from 0 to 9 and a decimal point. Pages 6 and 7

3 Let's write numbers that are 10 times and 100 times of 36.05 and numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of 36.05

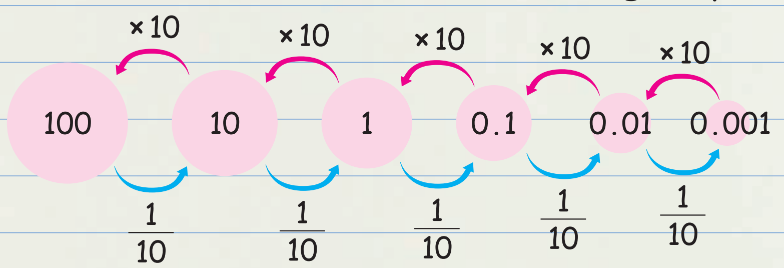
Red and blue arrows are used to show what we've understood.

Summarise what you have learned on your exercise book.

1. Decimal numbers and whole numbers

(1) What I understood.

For both whole numbers and decimal numbers, when there are 10 sets of a number, it is shifted to the next higher place value.



(2) Some interesting facts.

A number that is 10 times or $\frac{1}{10}$ of a number can be made by moving a decimal point.

10 times 1.34 is 13.4 and $\frac{1}{10}$ of 1.34 is 0.134

PROBLEMS 1

1 Express the following quantities by using the units written in the (   ).

● Changing denominations by using decimal numbers.

① 8695 g (kg) ② 320 mL (L) ③ 3.67 km (m) ④ 67.2 m (cm)

2 Let's answer the following questions.

● Understands numbers that are 10 times, 10 es, $\frac{1}{10}$, $\frac{1}{100}$ of a number.

① Times 0.825 by 10. ② Times 5.67 by 100.

③ $\frac{1}{10}$ of 72.3 ④ $\frac{1}{100}$ of 45.2

3 Let's find given numbers.

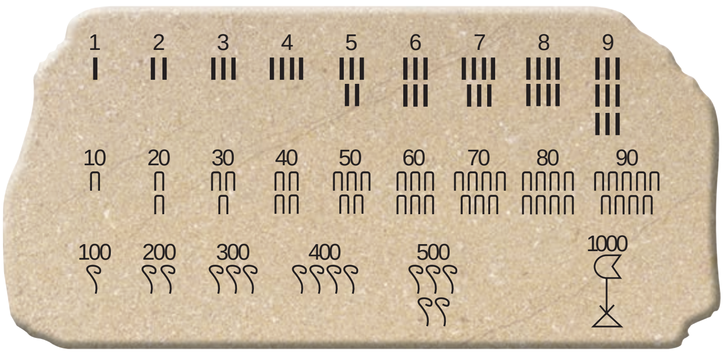
● Understands the relationship between decimal numbers and times 10, times 100, $\frac{1}{10}$ and $\frac{1}{100}$.

① When a given number was multiplied by 10 and further multiplied by 100, it became 307.4

② When a given number was multiplied by 100 and further divided by $\frac{1}{10}$, it became 20.5

③ When a given number was divided by $\frac{1}{10}$ and further divided by $\frac{1}{100}$, it became 0.175

PROBLEMS 2



Egyptian numeral system

1 When 176 is expressed in Egyptian numerals, it is as written below.

● Able to investigate the system of whole numbers.

① Write  as a whole number.

② Let's compare the way of Egyptian numeral to the way you have learned to express numbers and write them down.

③ Let's calculate $\begin{array}{r} 176 \\ +244 \\ \hline \end{array}$ in Egyptian numerals.

2 Amount per Unit Quantity

Every child in the classroom trained for the school carnival. They ran around the field after class.
Sam and Yapi made tables of the number of laps they ran around the field last week.

Sam trained for all 5 days and Yapi was sick on Friday so he ran for 4 days only.

Number of Laps Sam Ran

Days	Mon	Tue	Wed	Thu	Fri	Total
Number of laps	9	7	11	6	7	40

Number of Laps Yapi Ran

Days	Mon	Tue	Wed	Thu	Total
Number of laps	10	8	6	12	36

Who is more prepared for the sports carnival?
Is it Sam or Yapi?

Naiko: If you look at the total, Sam ran more.

Kekeni: But can we compare by the total laps if the number of days are different?

Yamo: If Yapi was not sick on Friday, how many laps would he have done?

Sare: If Yapi ran 4 laps on the absent day, then the total would have been 40 laps, which is the same as Sam's total.

Phrase

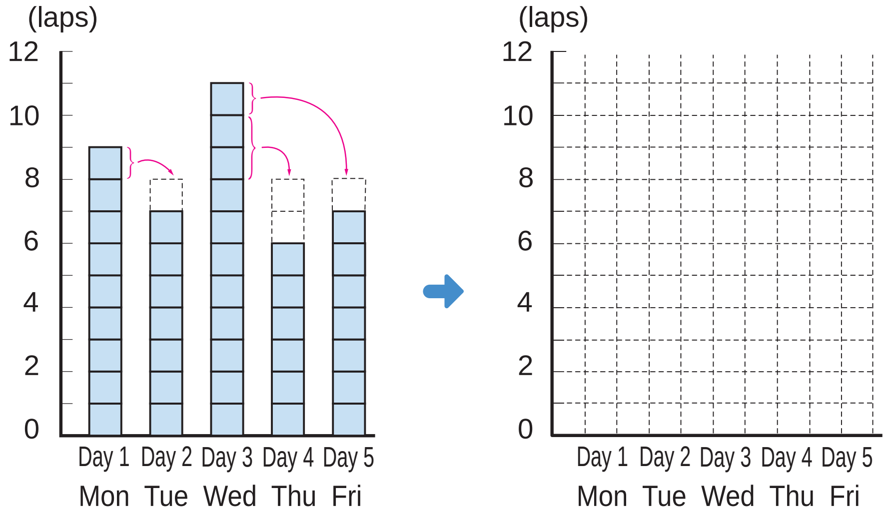
"If ~, then ~."

These terms are used when something is assumed or estimated. They are often used in mathematics when the conditions are changed to get the conclusion.

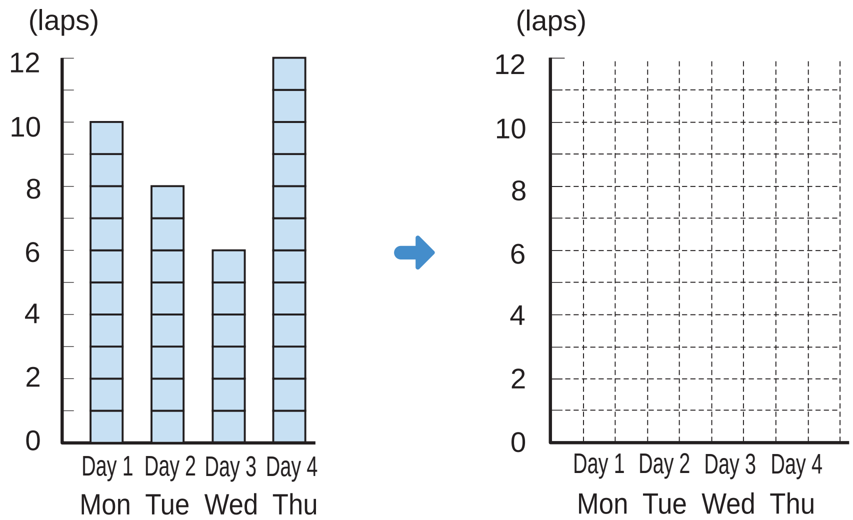
1 Mean

1 If Sam and Yapi ran the same number of laps every day, how many laps would it be per day?

❶ Sam ran the same total number of laps as last week, how many laps would he have run per day if he ran the same number of laps everyday?



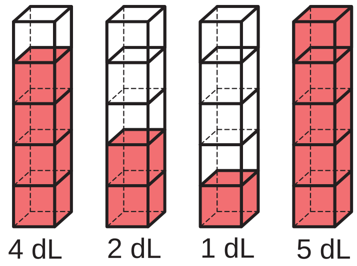
❷ Yapi ran the same total number of laps as last week, how many laps would he have run per day if he ran the same number of laps everyday?



❸ Which of them trained more?

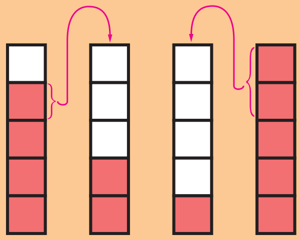
The process of making different sized measurements to the new measure evenly or equally is called **averaging**.

2 There are some juice in the containers on the right.



1. Let's average them so that each container has the same amount of juice.

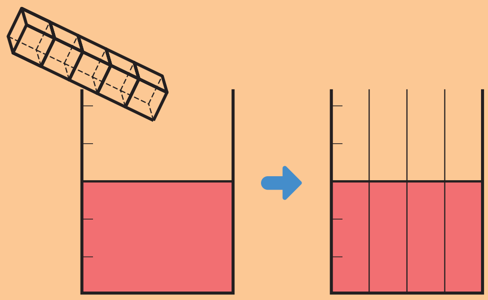
Kekeni's Idea



Move from larger to smaller amounts of juice.

Mero's Idea

Pour all the juice together and then divide the juice among the containers.



2. Think about how to calculate the averaged measure.

$$(4+2+1+5) \div 4 = \square$$

Total juice in 4 containers | Number of containers | Averaged juice per container

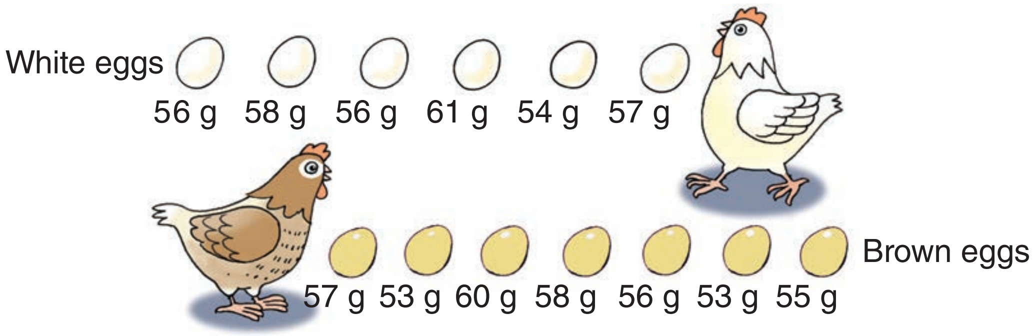
To average the measure for 4 containers, we divide the total amount of juice equally in all containers by the number of containers.

The same number or measure which is averaged from some numbers or measures is called **mean** of the original numbers or measures.

Mean = total ÷ number of items

3 There were 2 chickens, one laid brown and the other laid white eggs. The weights are shown below.

Which of the eggs are heavier? Compare by calculating the mean weight of their eggs.



Even for things that cannot be averaged in real life, if the number and amount is known, the mean can be calculated.

4 The table below shows the number of books 5 students read in August. What is the mean number of books read by the 5 students?

Number of Books Read

Name	Boni	Yata	Ken	Sawa	Yaling
Number of books read	4	3	0	5	2

Even for things that are impossible to be expressed in decimal numbers, like number of books, the mean can be expressed in decimal numbers.

2 Amount per Unit Quantity

1 Students are standing on the mats. Each mat is of the same size. Which one of Ⓐ, Ⓑ and Ⓒ is more crowded?

Ⓐ 2 mats, 12 students.
Ⓑ 3 mats, 12 students.
Ⓒ 3 mats, 15 students.

Ⓐ 2 mats, 12 students.

Ⓑ 3 mats, 12 students.

Ⓒ 3 mats, 15 students.

Let's think about how to compare crowdedness.

1 Let's compare which one is more crowded?

	Number of mats	Number of students
Ⓐ	2	12
Ⓑ	3	12
Ⓒ	3	15

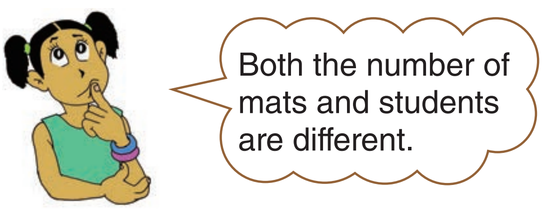
Ⓐ or Ⓑ → ☐

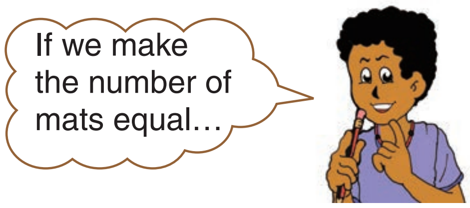
When the number of students are the same, the one with ☐ mats is more crowded.

Ⓑ or Ⓒ → ☐

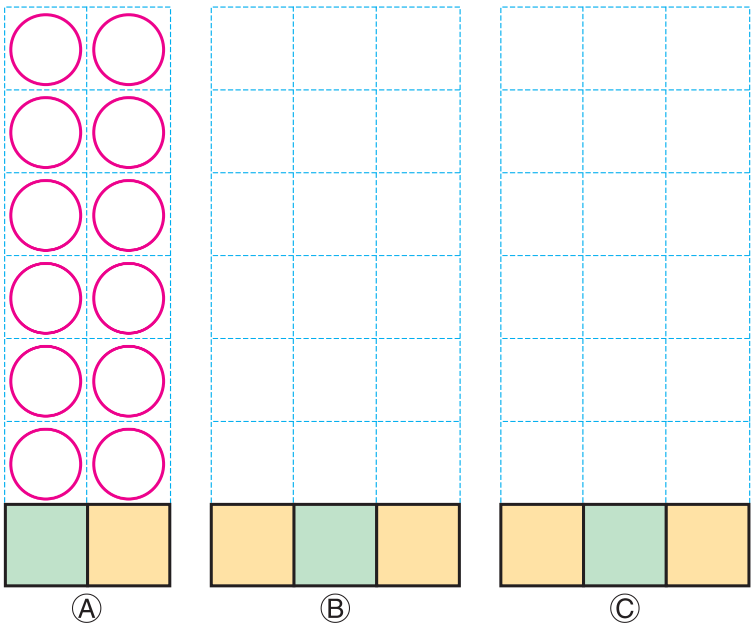
When the number of mats are the same, the one with ☐ students is more crowded.

Compare Ⓐ or Ⓒ → ☐





2 Let's find out how many students are on each of the mats.



3 The area of 1 mat is 1 m².

How many students are there in per 1 m² ?

Ⓐ	12	÷	2	=	☐
Ⓑ	12	÷	3	=	☐
Ⓒ	15	÷	3	=	☐
	Number of students		Area (m²)		Number of students per 1 m²

The level of crowding is expressed by 2 measures, the number of students and the area.
Usually we compare the level of crowding by using the same unit, such as **1 m²** or **1 km²**.
When people are not grouped in an organised way, the number of people per 1 m² expresses the mean of crowding.

Exercise

① Two groups of children are playing in two different garden shelters. One group has 10 children playing in a 8 m² garden shelter and the other group has 13 children playing in a 10 m² garden shelter. Which garden shelter is more crowded?

② There are two communities. Samuel's community with 7 km² and 1260 people and Robert's community with 10 km² and 1850 people. Which community is more populated?

2 The table on the right shows the population and the area of East Town and West Town.

Population and Area

	Population (people)	Area (km^2)
East Town	273 600	72
West Town	22 100	17

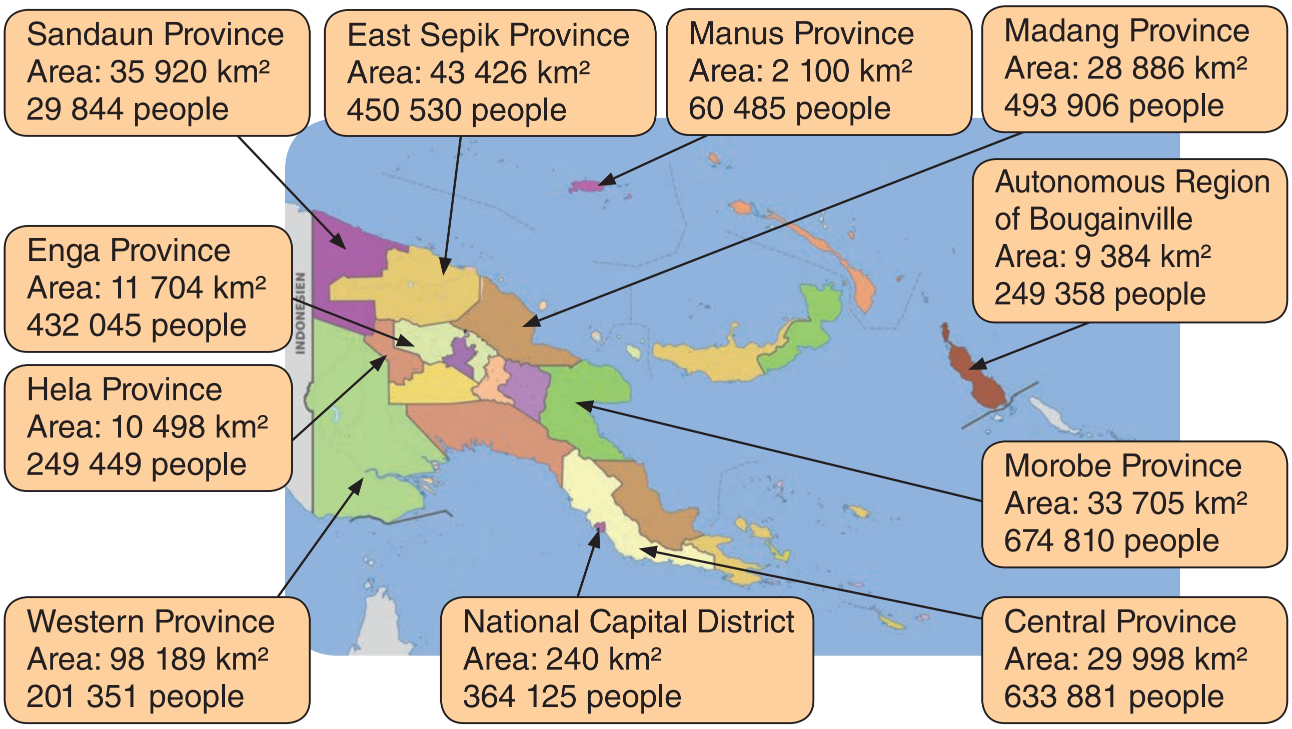
① Let's calculate the number of people per 1 km^2. Which one is more crowded?

The population per **1 km^2** is called **population density**.
The crowdedness of the number of people living in a country or province is compared using population density.

Number of people ÷ Area (km^2) = Number of people per 1 km^2

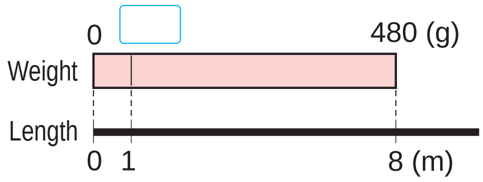
② Let's calculate the population density of each province and make a table. Round the first decimal place and give the answers in whole numbers. Find the relationship between population density and area?

Province	Population Density



3 A wire is 8 m long and weighs 480 g.

① How many grams (g) does this wire weigh per 1 m? Let's find the relationship of the numbers from the diagram and the table.



Weight (g)	?	480
Length (m)	1	8

÷8 (above the table, from 480 to ?) ; ÷8 (below the table, from 8 to 1)

To make 8 into 1, we divide it by 8.
So we can get the answer by 480 ÷ 8.

Expression : ☐

② How many g will 15 m of that wire weigh?

Let's develop an expression by drawing a diagram and a table.

Weight (g)		?
Length (m)	1	15

× ☐ (above the table) ; × 15 (below the table)

Expression : ☐

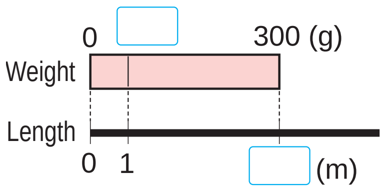
We know the weight of 1 m from question ①.

How are the numbers we already know related to each other?

③ We cut part of the wire and it weighed 300 g.

How many metres (m) long is this piece of wire?

Let's develop an expression by drawing a tape diagram and a table.



Weight (g)		300
Length (m)	1	?

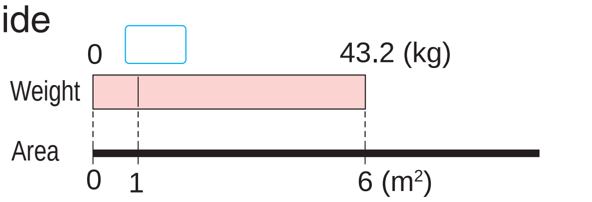
÷ ☐ (between the columns) ; ÷ ☐ (from 300 to ?)

Expression : ☐

Population density and weight per 1 m are called **amount per unit quantity**.

4 Ayleen's family grew sweet potatoes in their garden. They harvested 43.2 kg of sweet potatoes from a 6 m² at east side and 62.1 kg sweet potatoes from a 9 m² at west side. Which side of the garden is good harvest? Compare by using the number of sweet potatoes per 1 m².

East Side

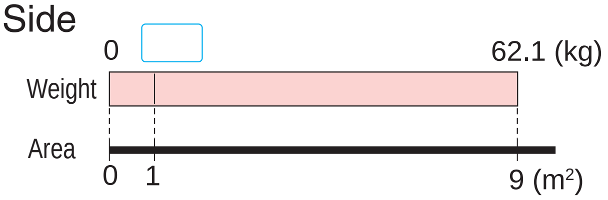


÷6

Weight (kg)	?	43.2
Area (m²)	1	6

÷6

West Side



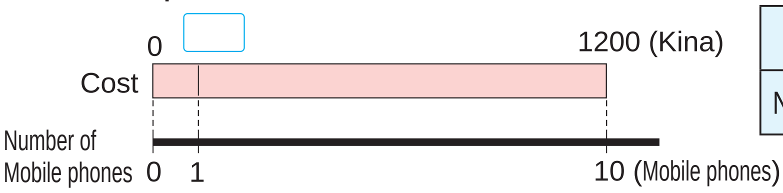
÷9

Weight (kg)	?	62.1
Area (m²)	1	9

÷9

5 There are two brands of mobile phones.
Brand A phone costs 1200 kina for 10 mobile phones.
Brand B phone costs 1040 kina for 8 mobile phones.
Which one is more expensive?
Compare the cost per mobile phone.

Brand A phone



÷10

Costs (Kina)	?	1200
Number of Mobile phones	1	10

÷10

Brand B phone

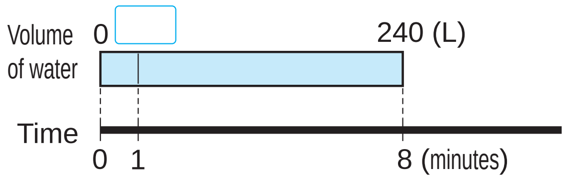
÷8

Costs (Kina)	?	1040
Number of Mobile phones	1	8

÷8

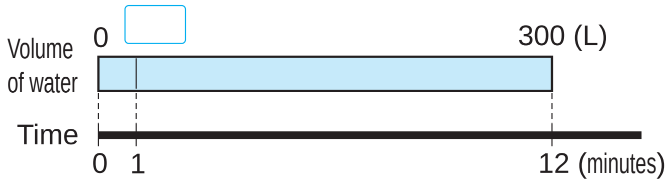
6 Brand A machine can pump 240 L of water in 8 minutes and Brand B machine can pump 300 L of water in 12 minutes.
Which machine pumps more water per minute?

Brand A



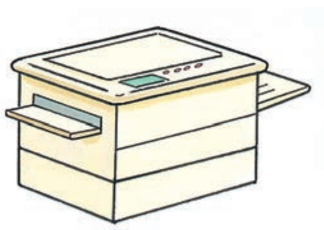
Volume of water (L)		
Time (min)		

Brand B



Volume of water (L)		
Time (min)		

7 Copier Ⓐ copies 300 sheets of paper in 4 minutes and copier Ⓑ copies 380 sheets of paper in 5 minutes.



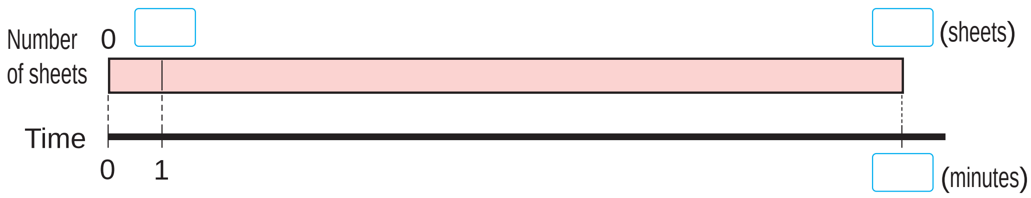
1. Which copier is faster?
2. How many sheets of paper can copier Ⓐ copy in 7 minutes?
3. How many minutes does it take for copier Ⓑ to copy 1140 sheets of paper?

Ⓐ

Number of sheets		
Time (min)		

Ⓑ

Number of sheets		
Time (min)		



Exercise

A small tractor ploughs 900 m² in 3 hours.
How many square metres (m²) can it plough in 8 hours?

EXERCISE

1 The table below shows the number of empty cans Anita collected in 5 days. What is the mean number of cans she collected per day?

Page 14

Number of Empty Cans Collected

Days	Day 1	Day 2	Day 3	Day 4	Day 5
Number of cans	6	7	5	8	8

2 There are two schools with same size classrooms. Which school Ⓐ or Ⓑ is more crowded?

Pages 15 to 17

Ⓐ 1080 students in 6 classes.

Ⓑ 1640 students in 8 classes.

3 A shop sells colour paints. The black paint costs 600 kina for 12 tins and the white paint costs 440 kina for 8 tins. Which colour paint is more expensive?

Page 19

4 A 180 m^2 plantation produced 432 kg cocoa. How many kilograms (kg) of cocoa were harvested per 1 m^2?

Page 20

Grades 3 and 4 Do you remember?

Let's calculate.

① 52×27	② 86×67	③ 35×78
④ 154×48	⑤ 565×64	⑥ 927×32
⑦ 5.4×4	⑧ 6.2×9	⑨ 2.5×8

PROBLEMS

1 The population of a district in PNG is about 39 000 people and the area is about 50 km². Calculate the population density of this district.

● Understanding how to calculate the population density.

2 An optical fiber cable costs 480 kina per 4 m.

● Understanding the meaning of measurements per unit.

① How much does 1 m of this cable cost?

② How much does 5 m of this cable cost?

③ A company IC Net bought the cable worth 1440 kina.
How many metres did the company buy?

3 A printer can print 350 sheets of paper in 5 minutes.

● Understanding the meaning of amount of work per unit.

① How many sheets of paper can it print in 1 minute?

② How many sheets of paper can it print in 8 minutes?

③ How many minutes will it take to print 2100 sheets of paper?

4 Anton's goal is to read 25 pages of a book per day.
He read an average of 23 pages for 6 days from Sunday to Friday.
To reach his goal over the 7 days from Sunday, how many pages must he read on Saturday?

● Understanding the relationship between mean, total and number of item.

5 The table below shows the duration of handstand and number of grade 5 students at Joyce's school. From this table, let's calculate the average duration of handstand per student in grade 5.

● Understanding the meaning of mean and measurement per unit and applying it to solve problems.

Duration of Handstand and the Number of Grade 5 students

Duration of handstand (second)	0	1	2	3	4	5	6	7	8	9	10
Number of students	3	0	2	4	5	16	9	10	4	6	1

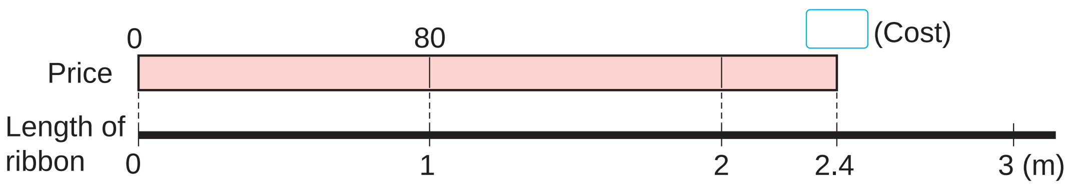
3 Multiplication of Decimal Numbers

1 Operation of Whole Numbers × Decimal Numbers

Moris is thinking about wrapping a present box with a ribbon around it. He needs 2.4 m of ribbon.

1 The price of the ribbon is 80 toea per 1 m.
Let's find out how much it would cost for 2.4 m.

① Draw a number line with a tape diagram.



② Write a mathematical expression.

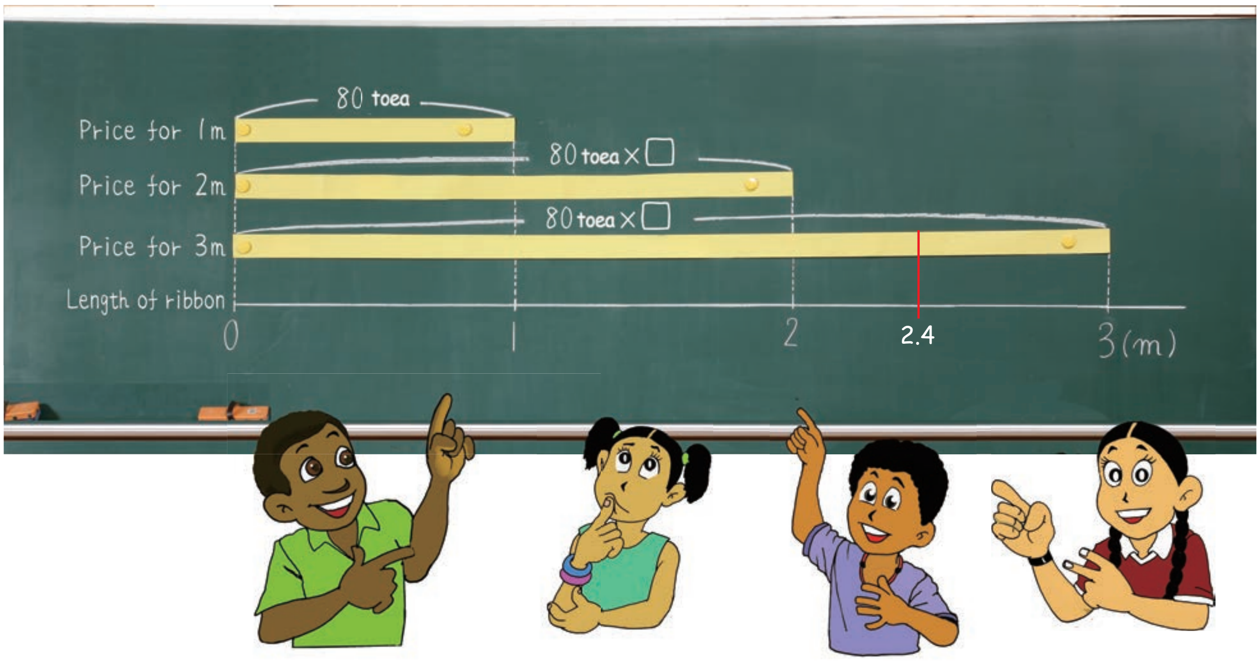
× □

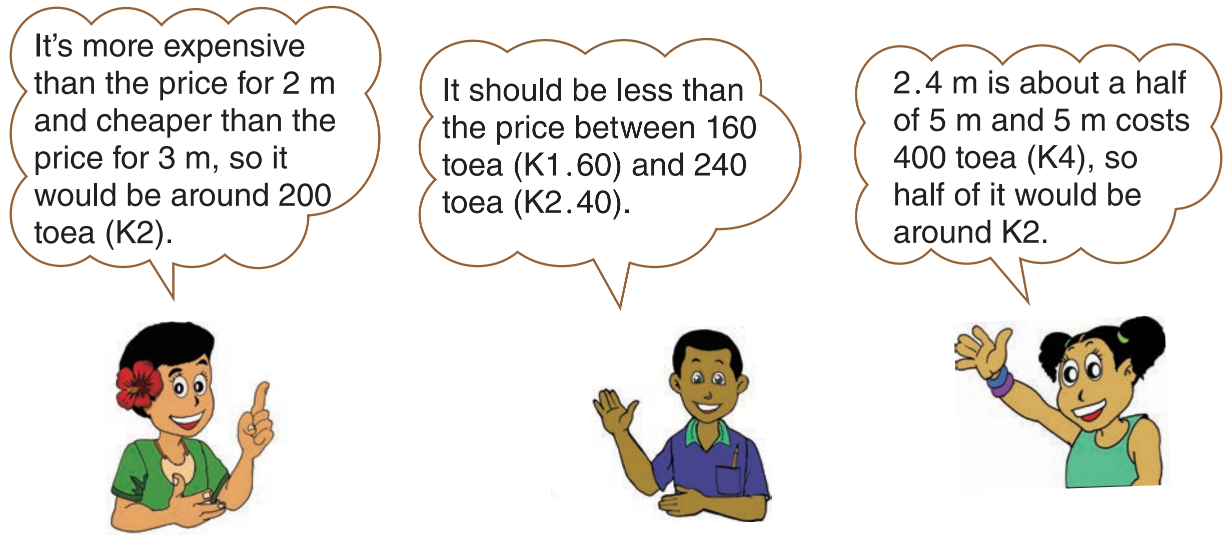
Price (toea)	80	?
Length of ribbon (m)	1	2.4

×2.4

Expression: □

3 Approximately, how much would the cost be?





As shown with the length of the ribbon, when the multiplier is a decimal number instead of a whole number, the expression is the same as for multiplication of whole numbers.

4 Let's think about how to calculate.

Activity

5 Let's explain the ideas below.

Kekeni's Idea

Firstly, I thought about the price of 0.1 m.

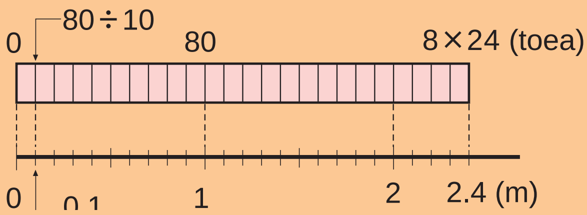
1 m = 80 toea

Price of 0.1 m $80 \div 10 = 8$ (toea)

2.4 m is 24 of 0.1 m, so,

Price of 2.4 m

$8 \times \square = \square$ (toea)



Price (toea)	80	8	?
Length (m)	1	0.1	2.4

(Price: 80 → 8 is $\frac{1}{10}$, 8 → ? is $\times \square$; Length: 1 → 0.1 is $\frac{1}{10}$, 0.1 → 2.4 is $\times 24$)

Vavi's Idea

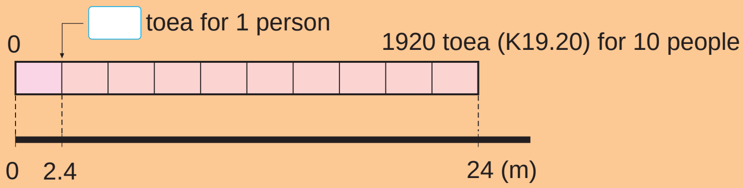
I used the rules of multiplication for multiplying by whole numbers.

Suppose 2.4 m is needed to wrap 1 box, then 24 m is needed for wrapping 10 boxes.

Cost for 1 ribbon $80 \times 2.4 = \square$

$\times 10$ ↓ ↑ $\frac{1}{10}$

Cost for 10 ribbons $80 \times 24 = 1920$



$\times 10$ means 10 times and $\frac{1}{10}$ means $\frac{1}{10}$ of a number.

6 Let's explain how to multiply 80×2.4 in vertical form.

80	One ●			80
× 2.4	←	$\times 10$	→	× 24
320				320
160				160
192.0	One ● ←	$\frac{1}{10}$	←	1920

Which idea in **5** is the same as this?

Multiplicaiton Algorithm of Decimal Numbers in Vertical Form

① We ignore the decimal points and calculate as whole numbers.

② We put the decimal point of the product in the same position from the right as the decimal point of the multiplier.

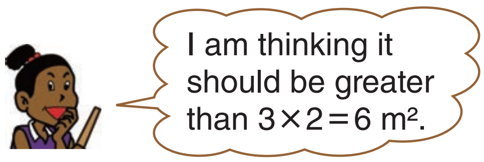
```
      8 0
   ×  2.4   …Number of digits after the decimal point is 1.
   ------
    3 2 0
  1 6 0
  -------
  1 9 2.0   …Number of digits after the decimal point is 1.
```

2 What is the area in m² of a rectangular flowerbed that is 3 m wide and 2.5 m long?

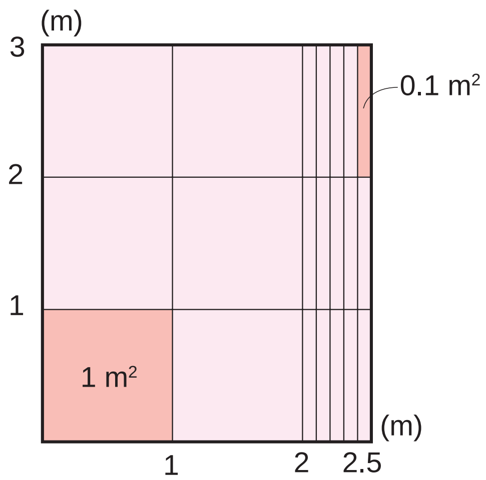
1 Write a mathematical expression.

[ ]

2 Approximately what is the area in m²?



3 Calculate the answer in vertical form.



6 of 1 m² is [ ] m²

15 of 0.1 m² is [ ] m²

Total [ ] m²

Exercise

Let's multiply in vertical form.

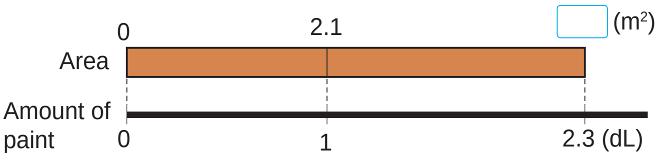
① 60×4.7　② 50×3.9　③ 7×1.6

④ 6×2.7　⑤ 24×3.3　⑥ 13×2.8

2 Operation of Decimal Numbers × Decimal Numbers

1 Hiro can paint 2.1 m^2 of wall with 1 dL paint. How many m^2 of wall can he paint with 2.3 dL?

① Let's draw a tape diagram and then write a mathematical expression.



Area able to paint (m^2)	2.1	?
Amount of paint (dL)	1	2.3

× □; ×2.3

Mathematical expression. □ × □

(Area able to paint with 1 dL) (Amount of paint (dL))

② Let's think about how to calculate.

Sare's Idea

We learned how to calculate (Decimal number) × (Whole number), thus using the rule of multiplication.

2.1 × 2.3 = □

↓ ×10 ↑ $\frac{1}{10}$

2.1 × 23 = □

Yamo's Idea

Then, it's better to change it into (Whole number) × (Whole number).

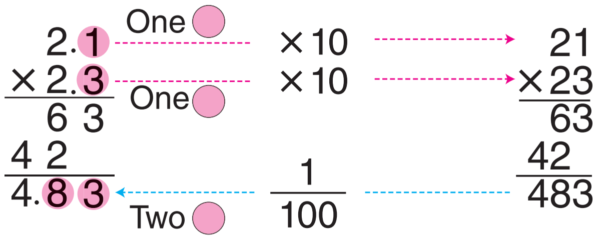
2.1 × 2.3 = □

↓ ×10 ↓ ×10 ↑ $\frac{1}{100}$

21 × 23 = □

Activity

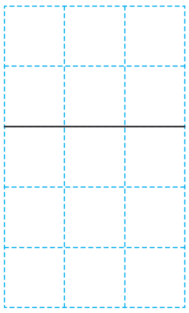
③ Let's explain how to multiply 2.1×2.3 in vertical form.

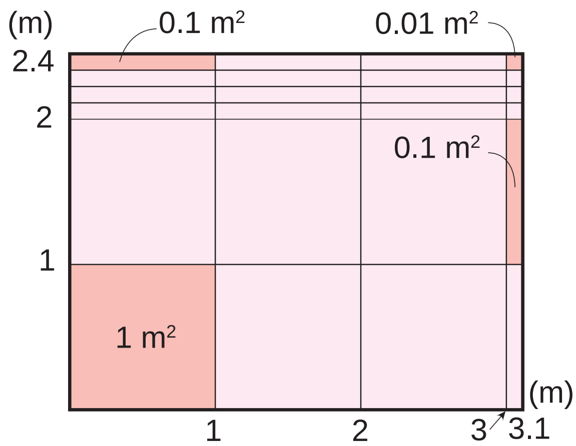


2 What is the area in m² of a rectangular flowerbed that is 2.4 m wide and 3.1 m long?

① Let's write a mathematical expression.

② Let's multiply in vertical form.





6 of 1 m² is ☐ m²

14 of 0.1 m² is ☐ m²

4 of 0.01 m² is ☐ m²

Total ☐ m²

The area of rectangles can be calculated by using the formula even if the lengths of the sides are decimal numbers.

Exercise

Let's multiply in vertical form.

① 1.2×2.4 ② 8.6×1.3 ③ 6.4×3.5

④ 2.5×2.8 ⑤ 0.2×1.6 ⑥ 0.8×2.5

3 Let's think about how to multiply 5.26×4.8 in vertical form.

5.26	Two ◯	×100 →	526
× 4.8	One ◯	×10 →	× 48
4208			4208
+2104			+2104
25.248	← Three ◯	$\frac{1}{1000}$	25248

When multiplying in vertical form, place the decimal point on the product by adding the number of digits after the decimal point of the multiplicand and the multiplier and count from the right end of the product.

4 Let's think about how to multiply 4.36×7.5

		4.	3	6	×☐ →				4	3	6
	×		7.	5	×☐ →		×		7	5
	2	1	8	0			2	1	8	0
3	0	5	2			3	0	5	2	
3	2.	7	~~0~~	~~0~~	← ☐	3	2	7	0	0

5 Let's put decimal points on the products for the following calculations.

①

```
   5.6
  ×4.3
   168
  224
  2408
```

②

```
   3.27
 ×  1.2
    654
   327
   3924
```

③

```
   1.48
 ×  2.5
    740
   296
   3700
```

Exercise

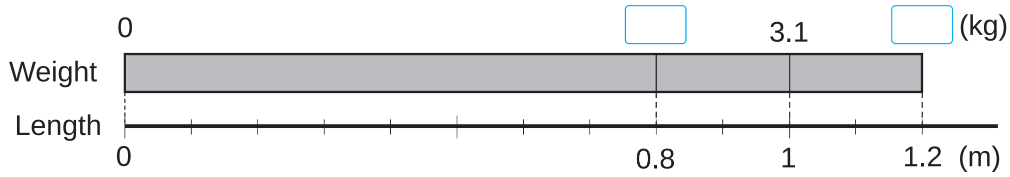
Let's multiply in vertical form.

① 3.14×2.6 ② 4.08×3.2 ③ 7.24×7.5

④ 1.4×4.87 ⑤ 4.8×2.87 ⑥ 8.2×2.25

Multiplication of Decimal Numbers Smaller than 1

6 There is a metal bar that weighs 3.1 kg per metre.
What is the weight of 1.2 m and 0.8 m of this bar respectively?



× □ ×□

Weight (kg)	?	3.1	?
Length (m)	0.8	1	1.2

×0.8 ×1.2

	3	.1
×	1	.2

1. Let's find the weight of 1.2 m metal bar.
2. Let's find the weight of 0.8 m metal bar.
3. Let's compare the sizes of the products and the multiplicands.

When the multiplier is a decimal number smaller than 1, the product becomes smaller than the multiplicand.
If the multiplier is a decimal number larger than 1,
Multiplicand < Product.
If the multiplier is a decimal number less than 1,
Multiplicand > Product.

7 Put decimal points on the products and compare the products and the multiplicands.

①

```
  25       2 5
×  6     × 0.6
 150      1 5 0
```

②

```
0.2 5     0.2 5
×   6     ×  0.6
 1 5 0     1 5 0
```

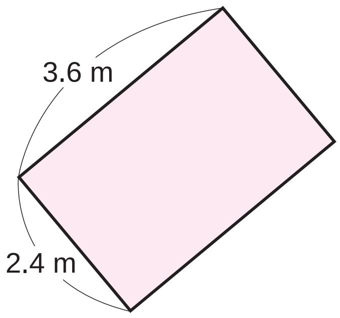
Exercise

Let's multiply in vertical form.

① 4.2×0.7　② 6.8×0.4　③ 0.8×0.3
④ 2.17×0.6　⑤ 0.14×0.5　⑥ 0.07×0.2

③ Rules for Calculation

1 Vavi and Kekeni calculated the area of the rectangle on the right.
Compare their answers.



Vavi's Idea

3.6×2.4=☐ (m²)

Kekeni's Idea

2.4×3.6=☐ (m²)

2 Problems Ⓐ and Ⓑ were calculated easily. Explain the reason why the right hand side methods are appropriate.

Ⓐ 3.8+2.3+2.7 ➡ 3.8+(2.3+2.7)

Ⓑ 1.8×2.5×4 ➡ 1.8×(2.5×4)

Calculation Rule (1)

Addition

① When 2 numbers are added, the sum is the same even if the order of the numbers added is reversed.

■ + ▲ = ▲ + ■

② When 3 numbers are added, the sum is the same even if the order of addition is changed.

(■ + ▲) + ● = ■ + (▲ + ●)

Multiplication

① When 2 numbers are multiplied, the product is the same even if the multiplicand and the multiplier are reversed.

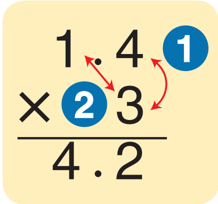
■ × ▲ = ▲ × ■

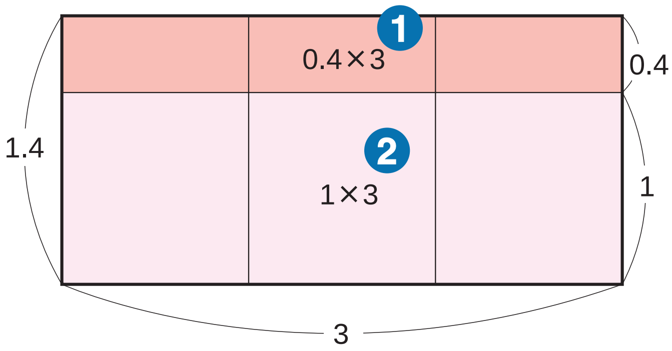
② When 3 numbers are multiplied, the product is the same even if the order of multiplication is changed.

(■ × ▲) × ● = ■ × (▲ × ●)

3 The answer to 1.4×3 can be calculated by thinking as follows. Let's explain the method by using this diagram.

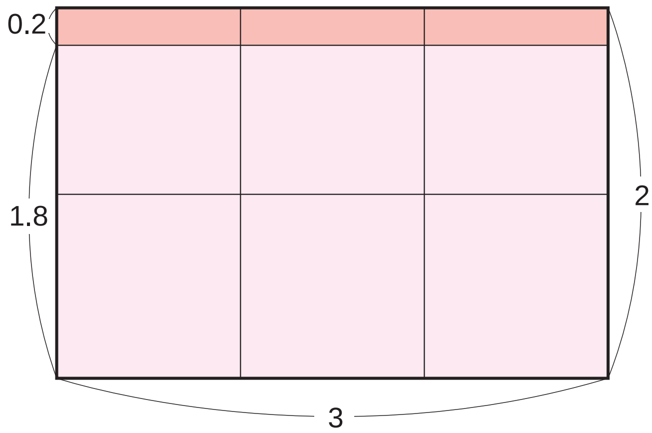
$$1.4\times3=(1+0.4)\times3$$
$$=1\times3+0.4\times3$$





4 The answer to 1.8×3 can be calculated by thinking as follows. Let's explain the method by using this diagram.

$$1.8\times3=(2-0.2)\times3$$
$$=2\times3-0.2\times3$$



Calculation Rule (2)

(■ + ▲) × ● = ■ × ● + ▲ × ●

(■ − ▲) × ● = ■ × ● − ▲ × ●

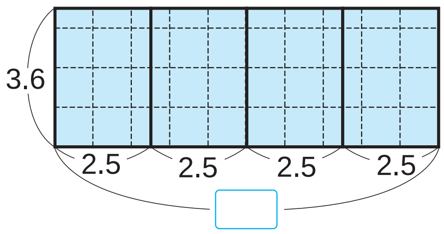
5 Let's explain how the calculation rules are used for easier calculations.

① $3.6\times2.5\times4$

$=3.6\times(\square\times\square)$

$=3.6\times\square$

$=\square$

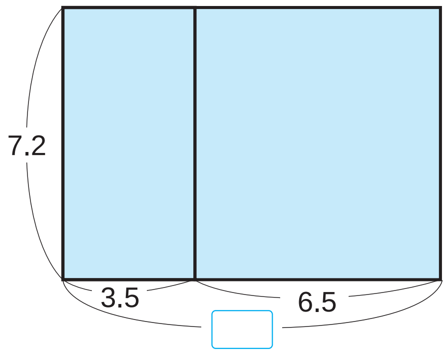


② $7.2\times3.5+7.2\times6.5$

$=7.2\times(\square+\square)$

$=7.2\times\square$

$=\square$



It is useful to remember the multiplications that have products such as 1 and 10.

$0.25\times4=\mathbf{1}$ $1.25\times8=\mathbf{10}$ $2.5\times4=\mathbf{10}$

Exercise

Let's calculate using the calculation rules. Write down how you calculated.

① $6.9\times4\times2.5$ ② $3.8\times4.8+3.8\times5.2$

③ $0.5\times4.3\times4$ ④ $3.6\times1.4+6.4\times1.4$

EXERCISE

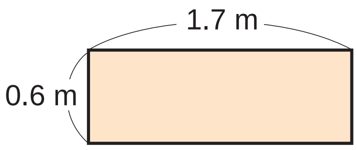
1 Let's multiply in vertical form. Pages 29 to 33

① 50×4.3 ② 6×1.8 ③ 26×3.2 ④ 3×1.4

⑤ 31×5.2 ⑥ 62×0.7 ⑦ 0.6×0.8 ⑧ 3.5×0.9

⑨ 1.5×3.4 ⑩ 0.3×0.25 ⑪ 1.26×2.3 ⑫ 4.36×1.5

2 Let's find the area of the rectangle. Pages 33 and 34



3 There is a wire that weighs 4.5 g per 1 m. Page 31

Let's find the weight of 8.6 m and the weight of 0.8 m of this wire.

4 Let's fill the □ with equal or inequality signs. Page 31

① 3.5×3.5 □ 3.5 ② 3.5×0.1 □ 3.5

③ 3.5×0.9 □ 3.5 ④ 3.5×1 □ 3.5

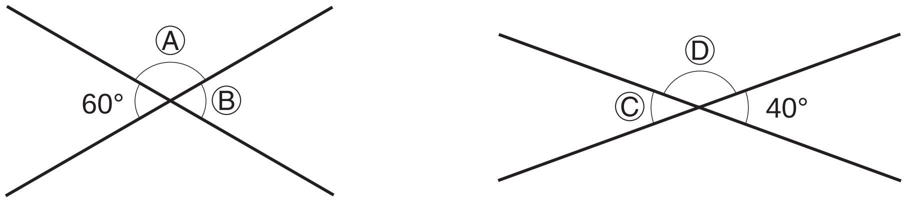
5 Choose numbers from the □ below and make problems for multiplications of decimal numbers.

Exchange your problems with your friends and solve. Page 34

1.5	7	0.8	30	2.3	5

Grade 4 Do you remember?

Find the sizes of the following angles Ⓐ to Ⓓ.



PROBLEMS

1 Summarize how to calculate with decimal numbers.

● Understanding how to calculate with decimal numbers.

To calculate 2.3×1.6 first multiply 2.3 by □ and multiply 1.6 by □, then calculate □×□ and then the answer is □ of 368.

2 Let's multiply in vertical form.

● Multiplying decimal numbers in vertical form.

① 28×1.3　　② 19×1.2　　③ 3.2×1.8

④ 0.4×0.6　　⑤ 3.5×0.7　　⑥ 7.6×0.5

⑦ 2.87×4.3　　⑧ 1.08×2.1　　⑨ 0.07×0.8

3 There is a copper wire that costs 90 kina per 1 m.

● Estimating the product with multiplier should be larger or smaller than 1.

① How much will it cost for 3.2 m?

② How much will it cost for 0.6 m?

4 Let's calculate in easier ways. Show how you calculated.

● Using the calculation rules.

① 0.5×5.2×8　　② 2.8×15

5 Let's put decimal points on the products for the following calculations.

● Using operations of decimal numbers × decimal numbers

①
```
    0.1 5
  ×   2.8
  -------
    1 2 0
    3 0
  -------
    4 2 0
```

②
```
      6.4 3
    ×   2.4
    -------
    2 5 7 2
  1 2 8 6
  ---------
  1 5 4 3 2
```

Mathematics Practices in Papua New Guinea

Topic 1: Counting to ten in three counting systems in PNG

Today in our modern society, we have the number system and standard units of measurement for mathematical practices and applications in daily life.
For example, we use digits from 0 to 9 to count and express quantities.
For measuring we use rulers, tape measures, scales and many more.
These systems are world wide and adopted from the western societies. Do you think in PNG, our ancestors used mathematical practices and applications?
Yes, traditionally, our ancestors used various ways of counting and expressing quantities in their vernacular. They also used various oblects and methods to measure. We have been practicing mathematical applications in our daily lives.
Let's discover counting systems from the Wuvulu Island (East Sepik Province), Motuan villages (Central Province) and Unggai area (Eastern Highlands Province).

1. The Wuvulu counting system

Number	Word
1	eai
2	guai
3	olumanu
4	obao
5	eipana
6	eipana ma eai
7	eipana ma guai
8	eipana ma olumanu
9	eipana ma obao
10	hefua

The word 'pana' (number 5) represents one hand therefore every number that succeeds 5 is one hand and that number. e.g. The number 6 exceeds 5 by 1 so that means that it is one hand and one. Hence, it is true to say that Wuvulu counting system uses base 5 which corresponds to one hand.

2. Motu counting system

Number	Word
1	ta
2	rua
3	toi
4	hani
5	ima
6	taura toi
7	taura hani
8	taura hanita
9	hitu
10	gwauta

In the Motuan culture, the counting system is base 10 but every ten has a name of its own. It depends on what you are counting.
For example, counting fish, coconuts, and shell money is different from counting money, stones, heads and sticks. The 'rabu' is the word for 10 when counting shell money or coconuts and 'ituri' is the word for 10 when counting fish.

3. Unggai counting system

Number	Word
1	mako
2	lowe
3	loweki mako
4	loweki loweki
5	ade mako
6	ade makoki mako
7	ade makoki lowe
8	ade makoki loweki mako
9	ade makoki loweki loweki
10	ade lowe

The base used in Unggai usually changes after every 5 count. The word for 5, 'ade' means one whole hand. Ade lowe (10) means two hands. Further counting uses feet.
For example, the expression for 15 is 'ade loweki ika mako', meaning two hands and one foot. 20 can be expressed in two ways; either 'ade loweki ika lowe' (2 hands and 2 feet), or 'we mako' ('we' means 'person'), that is to say, 2 hands and 2 feet make one whole person.

Ethnomathematical Lessons for PNG by Mathematics students of UPNG-Goroka campus, 1993

4 Congruence and Angles of Figures

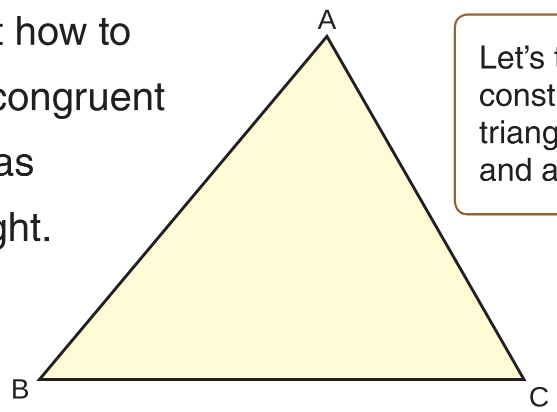
Is it possible to tell the shape only by words?
Joyce drew a triangle on a 1 cm grid sheet.
In order for her friends to draw the same figure, she is explaining the shape only by words on the board.

Let's draw triangle ABC with the following:
1. BC is 3 cm long.
2. Perpendicular line from A to BC is 2 cm long.

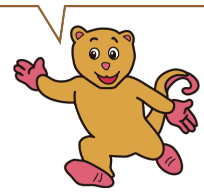
Two figures are congruent if they fit by lying on top of one another.

1 Congruent Figures

1 Let's think about how to draw a triangle congruent to triangle ABC as shown on the right.



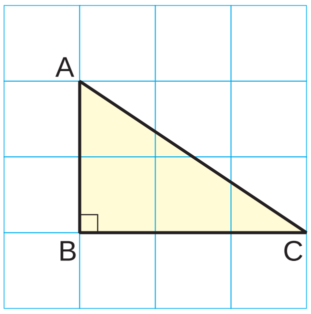
Let's think about constructing a congruent triangle with a compass and a protractor.



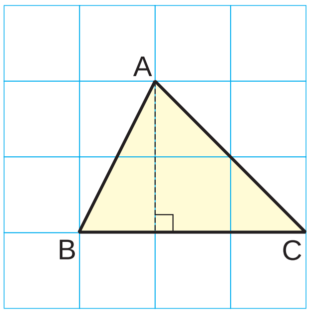
Activity

Let's explore how to draw congruent figures and their properties.

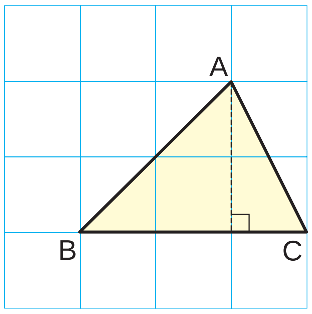
What kinds of triangle can you draw from Joyce's explanation?



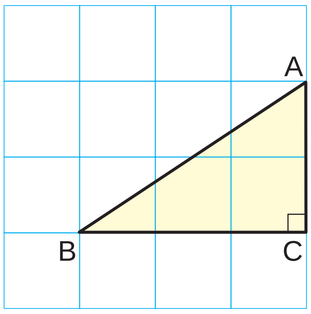
Ambai



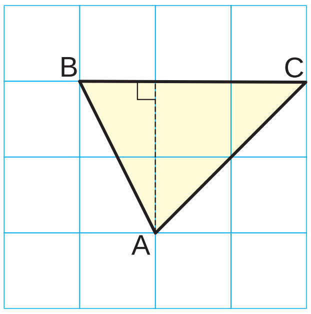
Naiko



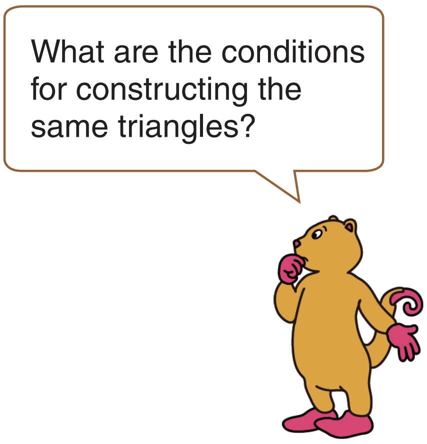
Yamo



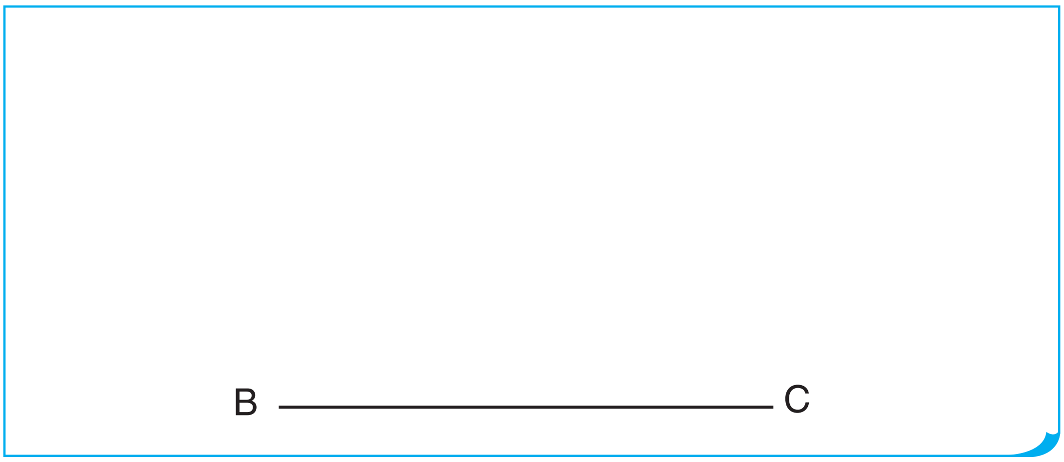
Mero

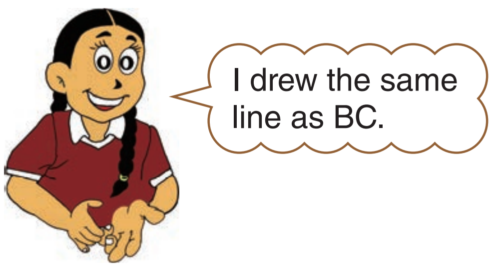


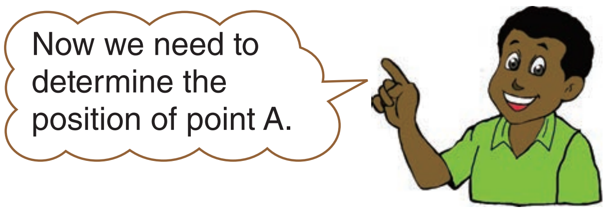
Vavi



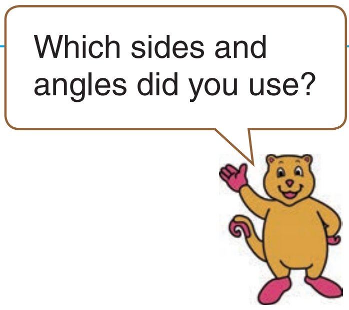
1. Let's think about how to use a compass and a protractor to draw a triangle congruent to triangle ABC.

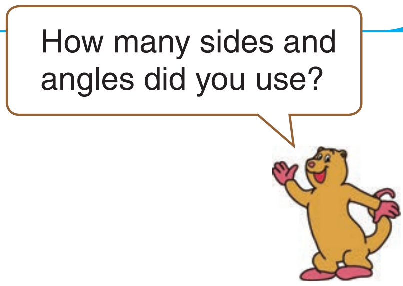




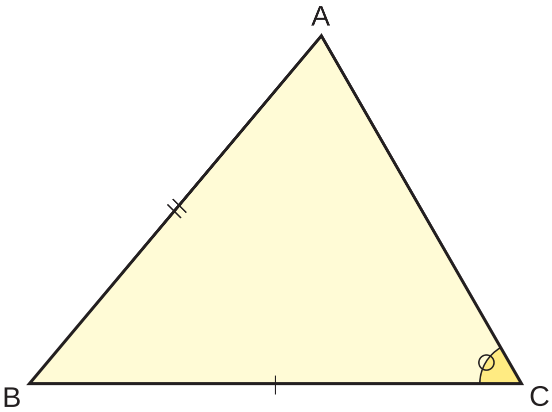


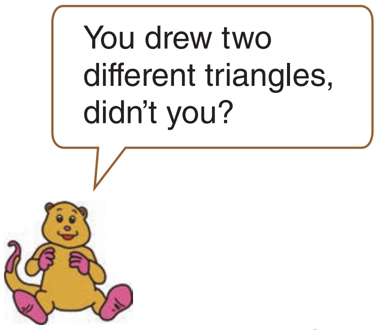
❷ Let's discuss how to locate point A to draw a triangle congruent to triangle ABC.

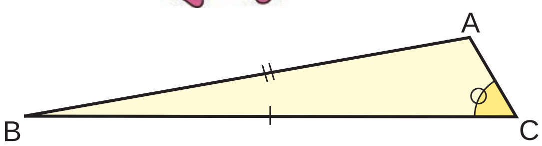




❸ If you know angle C and the length of sides AB and BC, then you can draw triangle ABC easily.





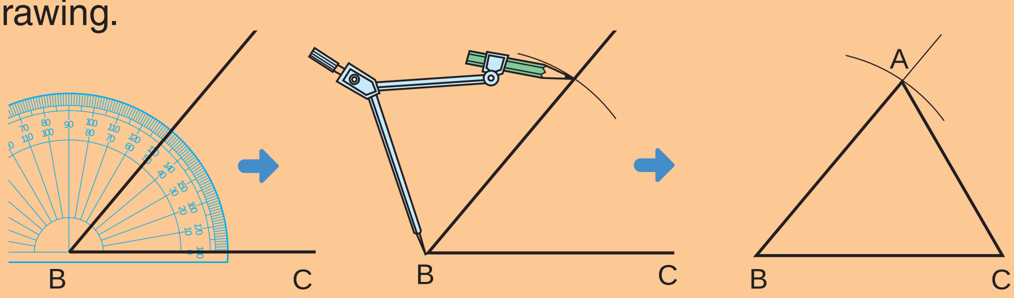


❹ Let's summarise how to draw a congruent triangle.

Let's explain.

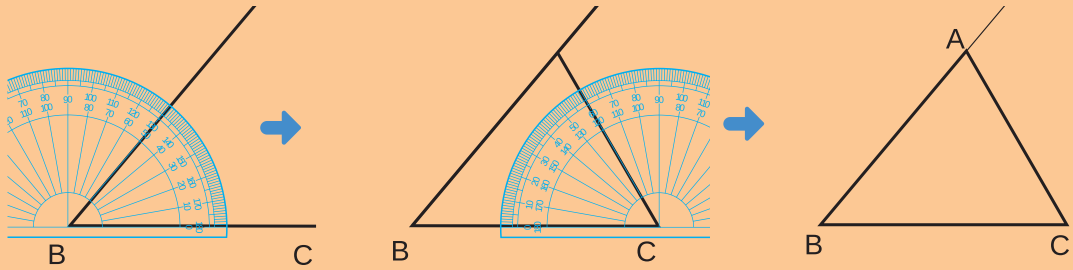
Yamo's Idea

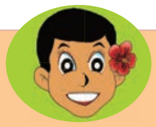
Measure the lengths of two sides and the angle between them for drawing.



Sare's Idea

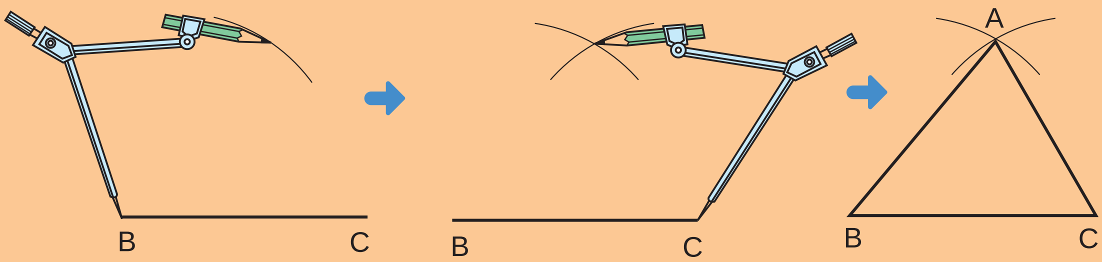
Measure two angles and the length between them for drawing.



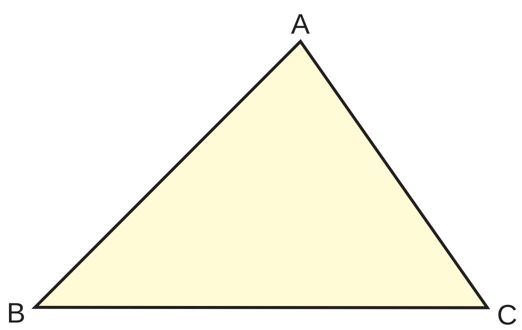


Ambai's Idea

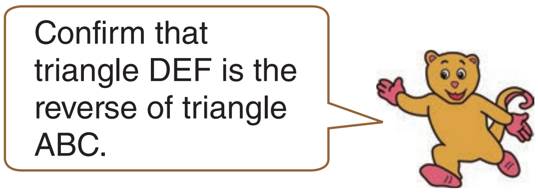
Measure all three sides for drawing.

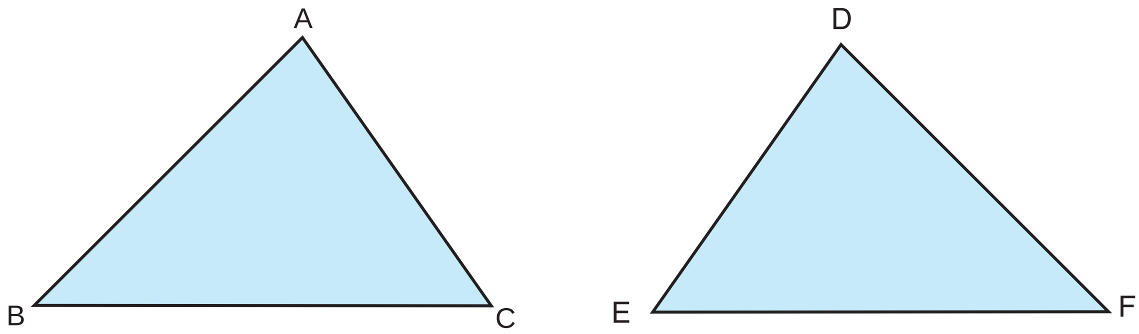


5 Let's draw a triangle congruent to triangle ABC as shown on the right.



2 Triangle DEF below is the reverse of triangle ABC.



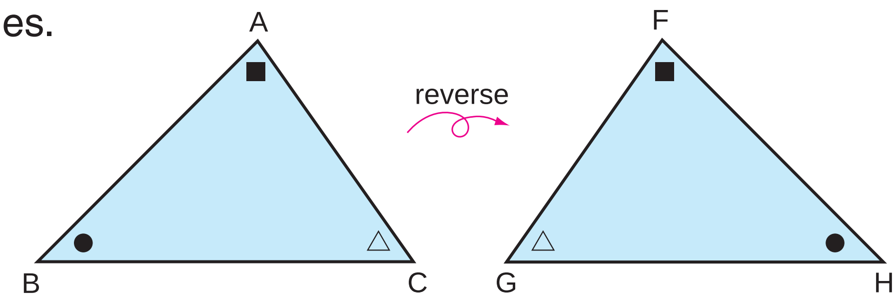


1. Let's confirm whether the two triangles match when they fit by lying on one another.

Two figures are also congruent if they match by reverse.
In congruent figures, the matching points, the matching sides and the matching angles are called; **corresponding vertices, corresponding sides and corresponding angles**, respectively.

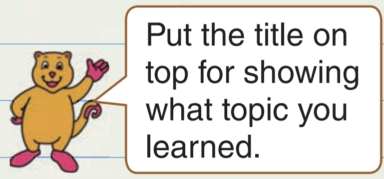
2. In the above triangles ABC and DEF, find the corresponding sides and compare the lengths.
3. Find the corresponding angles and compare their sizes.

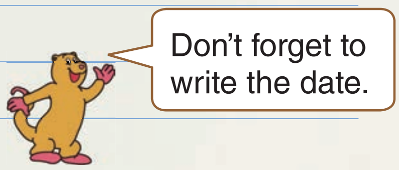
In congruent figures, the corresponding sides are equal in length and the corresponding angles are also equal in size.
Congruent figure is a figure which is identical in shape, size and angles.



Date

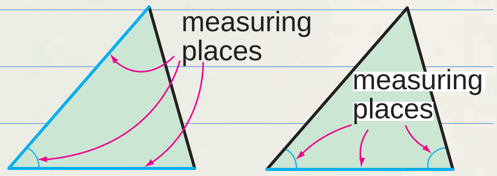
Congruent Triangle

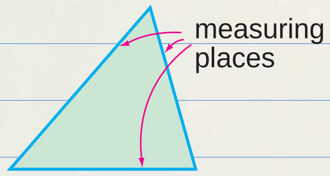




1 Findings

- Two figures are congruent if they fit by lying on top of one another.
- There are three ways for drawing a congruent triangle. The diagrams on the right shows the place for measuring.

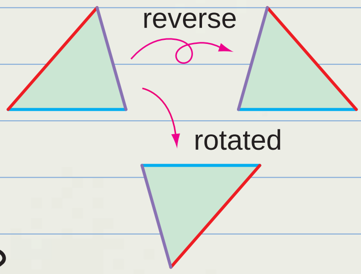




- Two triangles are also congruent if they match by flipping over.
- Compass can be used as a tool to copy the same lengths.
- Matching sides and angles are called corresponding sides' and 'corresponding angles', respectively.

2 Interesting points

- The rotated or reversed figure is also congruent.



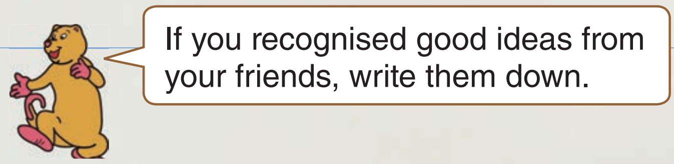
- There are three conditions for congruence between two triangles. Are there four conditions for quadrilaterals?
- It is interesting that two triangles with all three equal angles are not always congruent.

3 What was difficult

- Finding corresponding sides and angles when the figure is reversed.

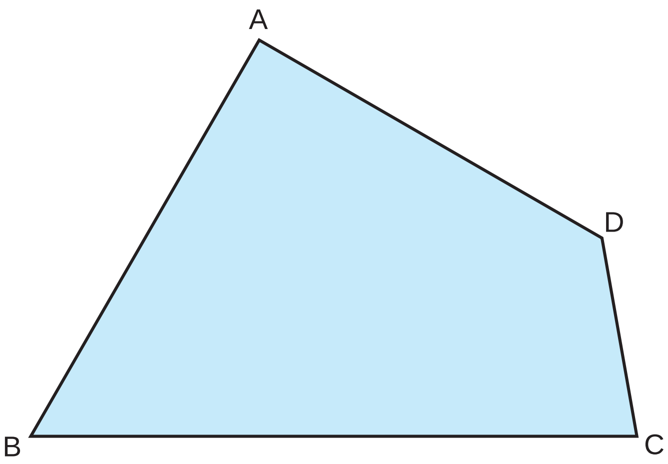
4 Good ideas from Friends

- Ambai's idea for drawing a congruent triangle requires only a compass and does not need to measure angles.



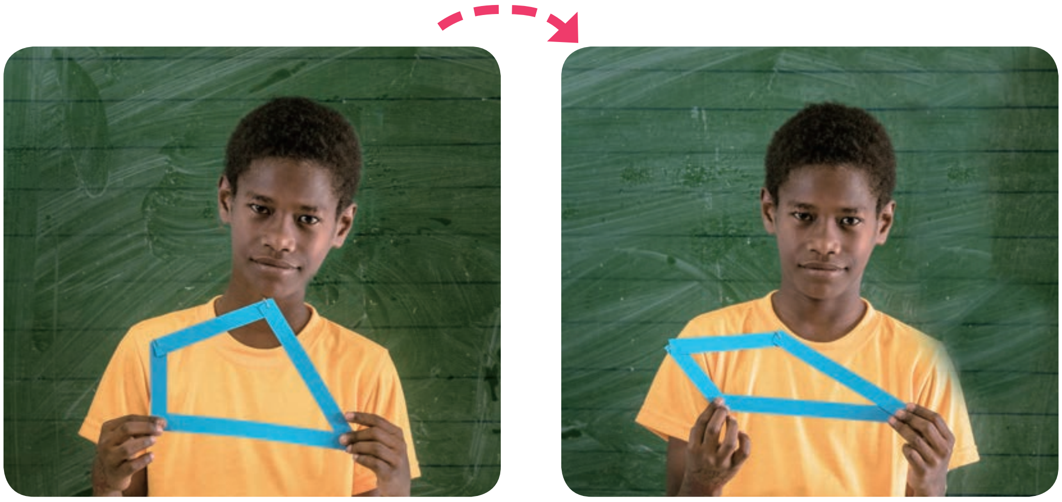
Congruent Quadrilaterals

3 Let's think about how to draw a quadrilateral which is congruent to quadrilateral ABCD as shown on the right.

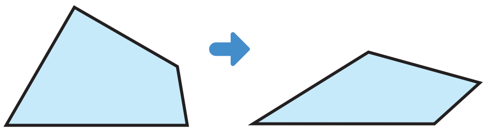


Can we adopt the way on how to draw a congruent triangle?

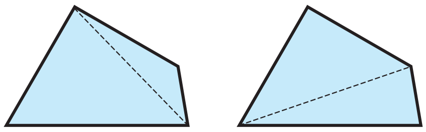
1 If you measure four sides of the quadrilateral for drawing, can you draw a congruent quadrilateral?



I measured the four sides and drew but I got various shapes.



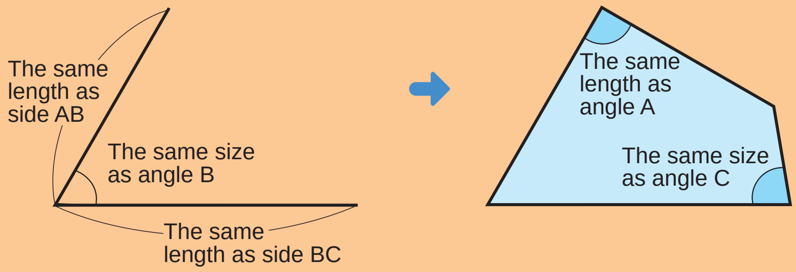
Using the diagonal, I split the quadrilateral into two triangles.



❷ Let's discuss how to draw a congruent quadrilateral with your friends. How can we locate the fourth point?

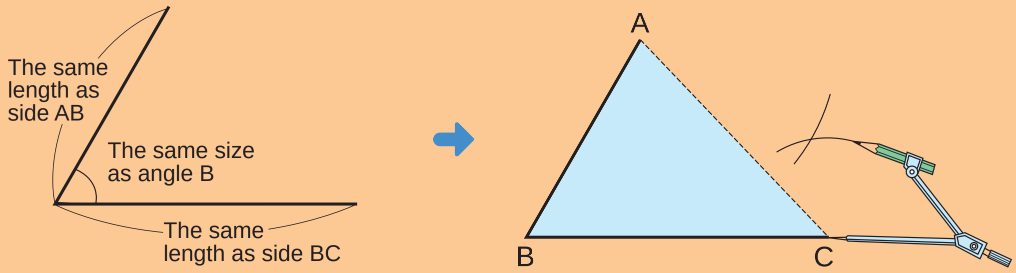
Mero's Idea

Measure angles A and C and determine point D.



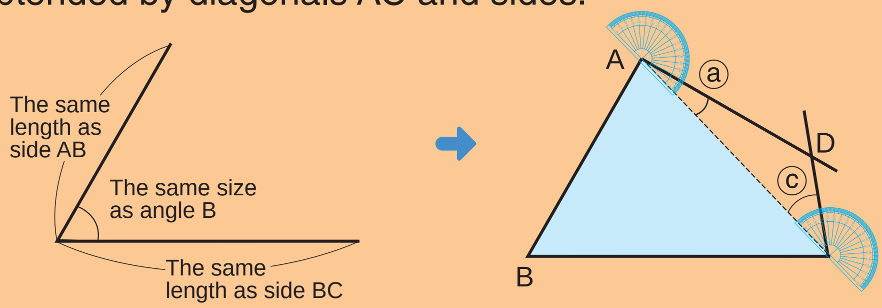
Kekeni's Idea

Use Ambai's idea (page 41) for drawing a congruent triangle to determine point D on quadrilateral. Measure sides AD and CD.



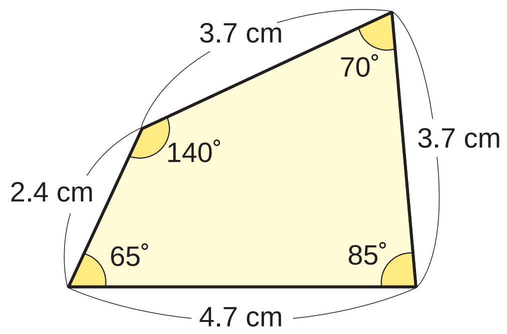
Naiko's Idea

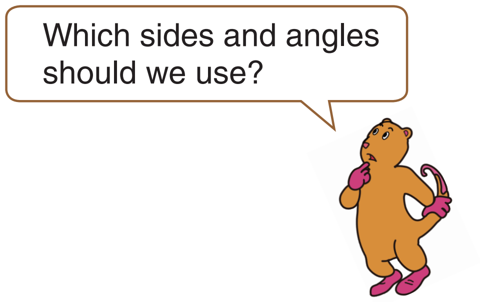
Use Sare's idea (page 41) for drawing a congruent triangle to determine point D on quadrilateral. Measure angles which are subtended by diagonals AC and sides.



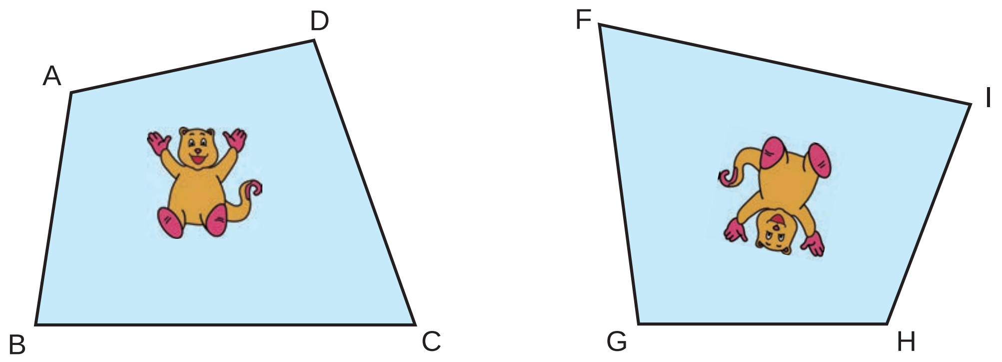
❸ Use the ideas above to draw a congruent quadrilateral for quadrilateral ABCD.

4 Let's draw a congruent quadrilateral to the one shown below.





5 The two quadrilaterals below are congruent.
Describe the corresponding vertices, sides and angles.



1. The corresponding vertex to A is H.
   Write down in your exercise book the other corresponding vertices.

2. The corresponding side to AB is HI.
   Write down in your exercise book the other corresponding sides.

3. The corresponding angle to A is H.
   Write down in your exercise book the other corresponding angles.

EXERCISE

1 Let's draw a congruent triangle with the following conditions.

Pages 39 and 40

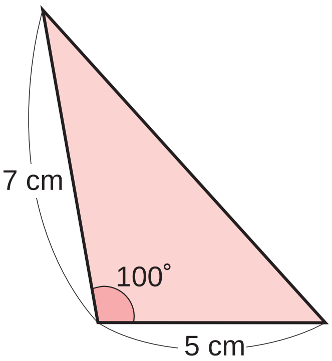
① A triangle with sides 4 cm, 7 cm and 8 cm.

② A triangle with sides 5 cm, 8 cm and an angle of 75° between them.

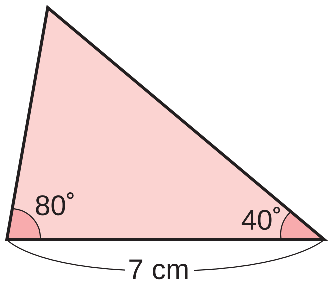
③ A triangle with angles 45°, 60° and a side with 6 cm between them.

④ Triangles ⓐ and ⓑ

ⓐ

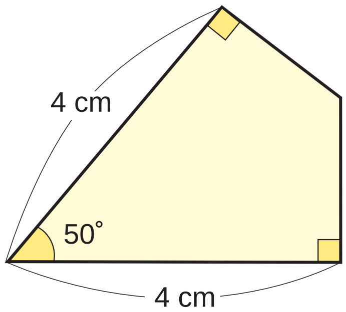


ⓑ



2 Let's draw a congruent quadrilateral to the one on the right.

Pages 44 and 45



Grade 4 Do you remember?

Let's calculate.

① 120 + 60	② 243 + 29	③ 684 + 55
④ 254 + 523	⑤ 675 + 167	⑥ 493 + 728
⑦ 180 − 70	⑧ 383 − 47	⑨ 742 − 68
⑩ 947 − 816	⑪ 657 − 219	⑫ 526 − 338

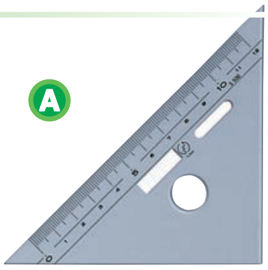
2 Angles of Triangles and Quadrilaterals

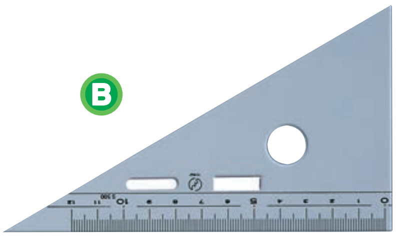
1 Let's explore the sum of two angles excluding the right angle.

The sum of the two angles are;

Ⓐ ☐°

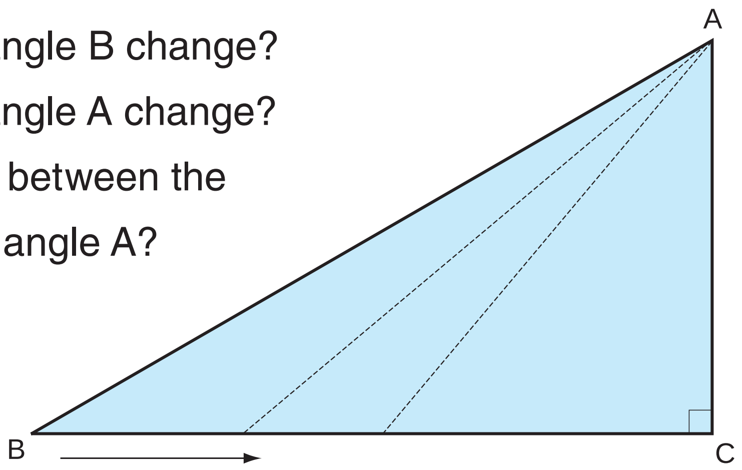
Ⓑ ☐°





In the right triangle below, we are going to move vertex B toward C.

1. How does the value of angle B change?
2. How does the value of angle A change?
3. Is there any relationship between the changes in angle B and angle A?



4. Look at the change in the sum of angle A and angle B.

Angle A (degrees)	60	50				
Angle B (degrees)						
Sum (degrees)						

From the above table, what did you find about the sum of the three angles in a right triangle?

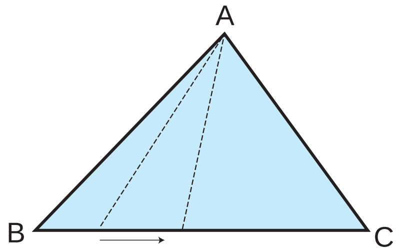
Let's explore the sum of three angles in a triangle.

Angles of Triangles

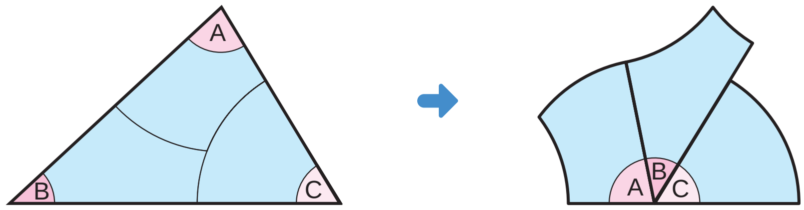
A straight angle is 180°, isn't it?

2 Look at the sum of the 3 angles of a triangle in various ways.

① Draw a triangle and measure the angles with a protractor.
The sum of the 3 angles is ☐°.

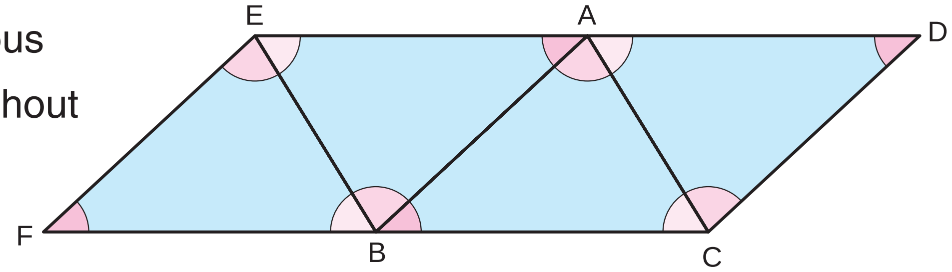


② Cut out the 3 angles and place them together as shown below.



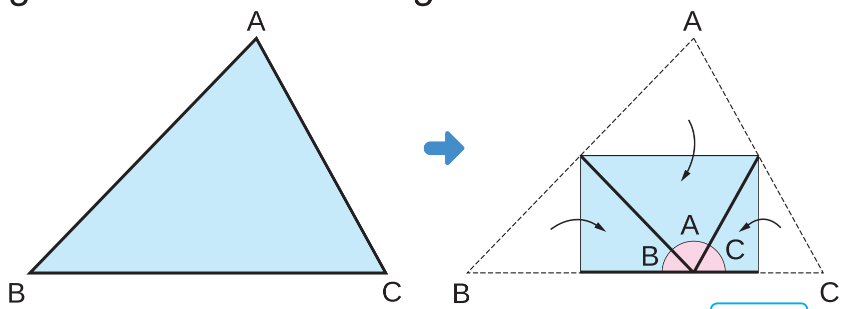
Since the 3 angles together make a straight line, the sum of these angles is ☐°.

③ Put together triangles with the same shape and size to make a continuous pattern without any gaps.



Since 3 angles at points A and B make a straight line, their sums are ☐°.

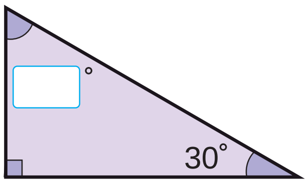
④ Fold a triangle to connect the 3 angles.



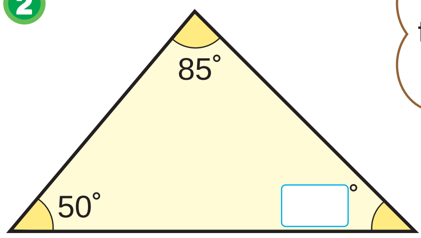
Since the 3 angles make a straight line, the sum is ☐°.

In any triangles, the sum of the three angles is 180°.

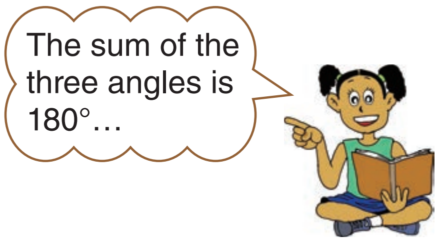
3 Let's calculate and fill in the ☐ with appropriate numbers.

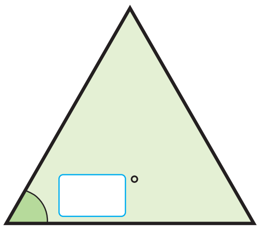
1


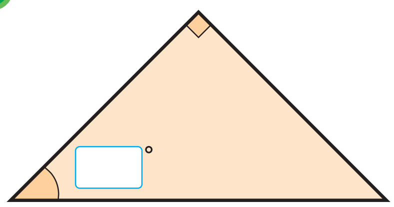
Right-angle triangle

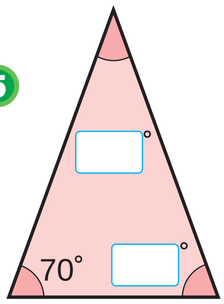
2


Isosceles triangle



3

Equilateral triangle

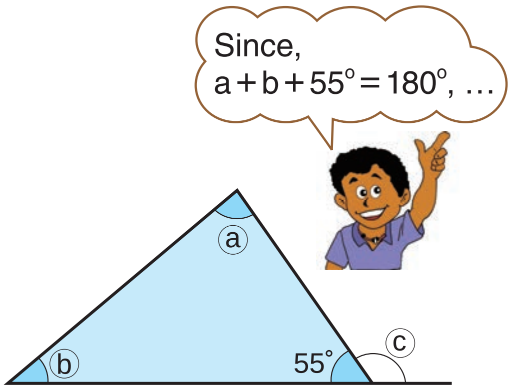
4

Isosceles triangle

5


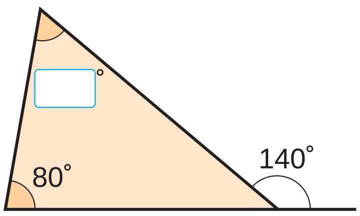
Isosceles triangle

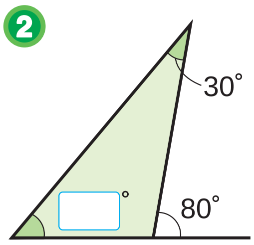
4 Look at the triangle below.

1. Find the sum of angles ⓐ and ⓑ.
2. What is angle ⓒ?
3. What can you conclude about the relationship among angles ⓐ, ⓑ and ⓒ?



5 Let's calculate and fill in the ☐ with appropriate numbers.

1


2


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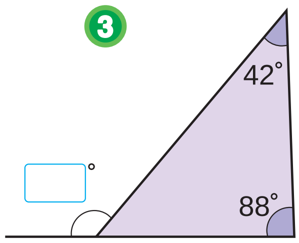
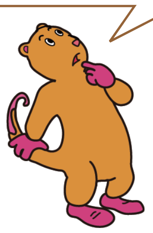
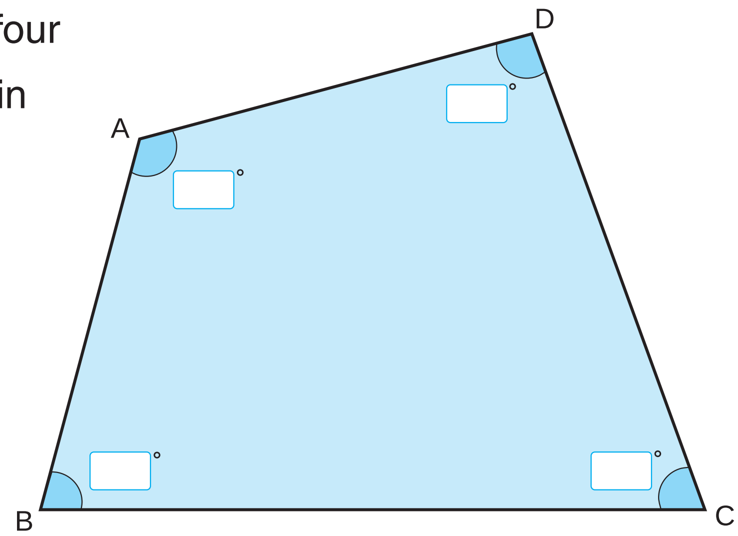


Angles of Quadrilaterals

6 Let's explore the sum of four angles in a quadrilateral in various ways.

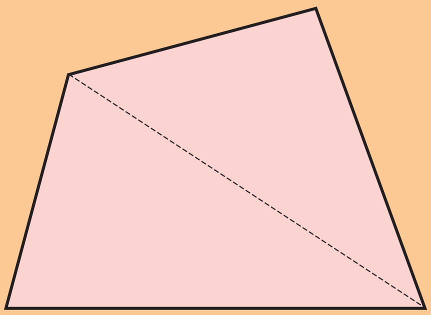
How did we find the sum of three angles in the triangles?





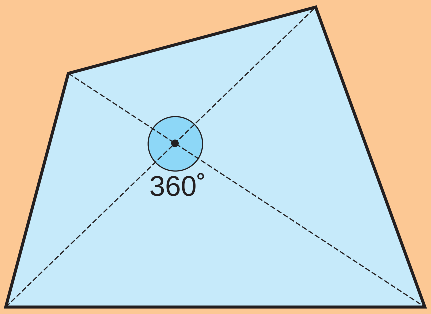
1. Measure the four angles with a protractor.
2. Let's calculate through dividing the quadrilateral by diagonals.

Vavi's Idea



Divide by a diagonal. There are two triangles inscribed. Therefore,
□° × 2 = □°.

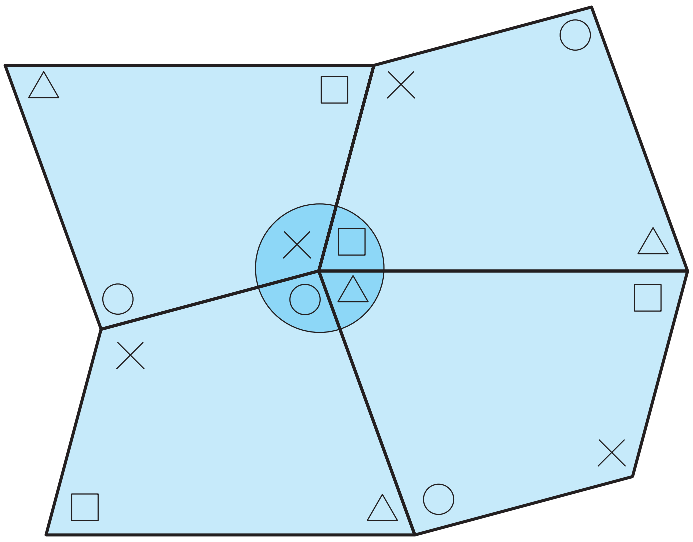
Mero's Idea



Divide a quadrilateral into four by diagonals.
There are four triangles inscribed, □° × 4 = □°
subtract the extra □°, so □°.

3. Let's think about and discuss other ways of finding the sum of angles in a quadrilateral.

4 Let's explore the sum of quadrilaterals through tessellation.



5 Share your findings with your friends.

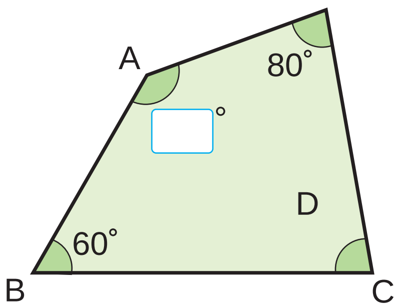
What have you learned?

Activity

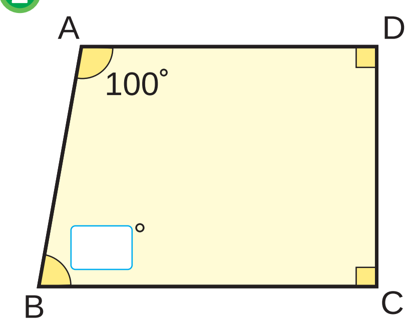
In any quadrilateral, the sum of 4 angles is 360°.

7 Let's fill in the ☐ by calculations.

1



2



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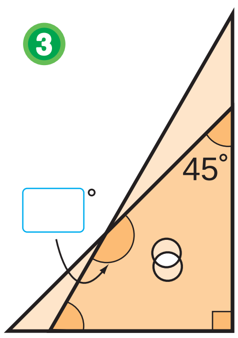
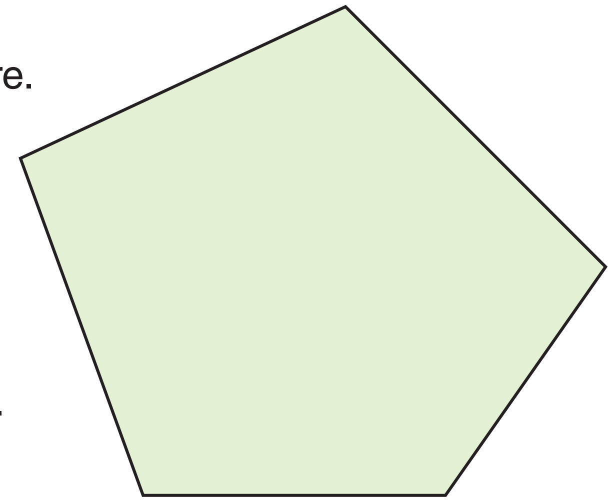


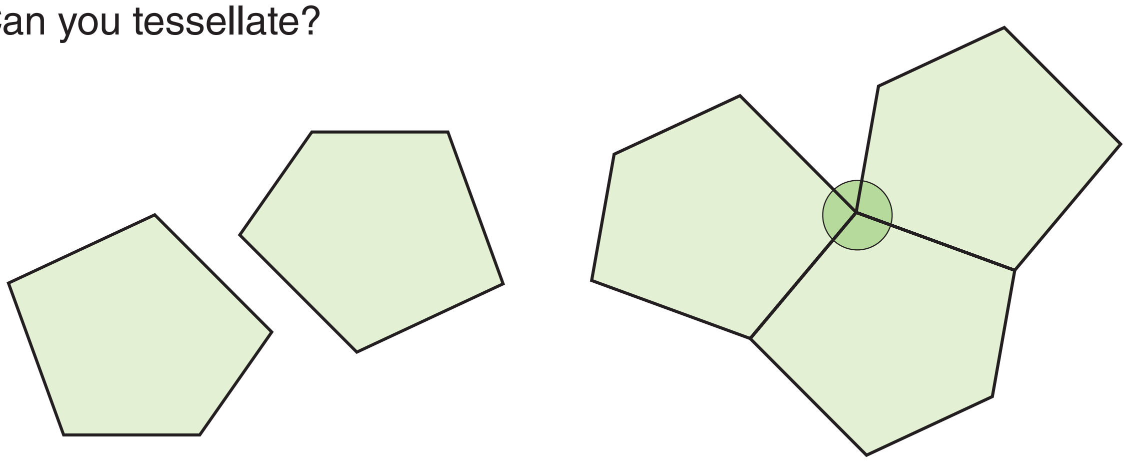
Angles of Polygons

A pentagon is a five sided figure.



8 Let's explore how to find the sum of 5 angles in a pentagon.

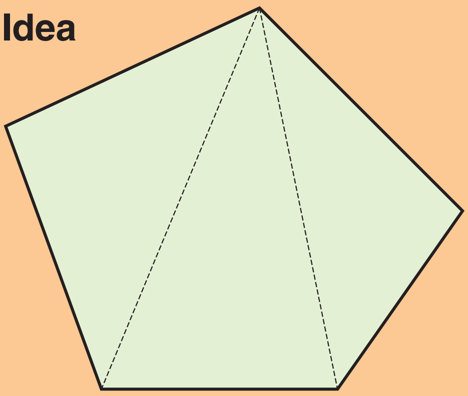
① Can you tessellate?

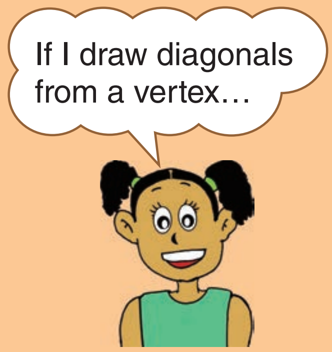


For tessellation of figures, the sum of angles which meet at one vertex is 360°. In the case of a pentagon, it cannot be tessellated.

② Let's divide a pentagon into triangles.

Yamo's Idea

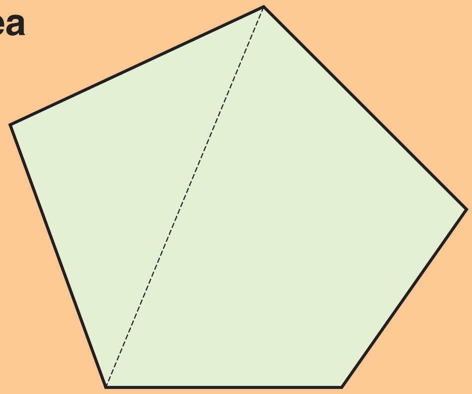




Draw diagonals and divide it into ☐ triangles.

Therefore, 180° × ☐ = ☐ °.

Mero's Idea



Divide a pentagon into a triangle and a quadrilateral.

Therefore, 180° + ☐° = ☐°.

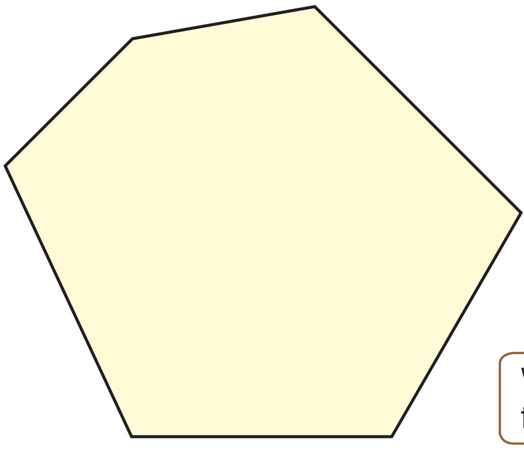
Activity

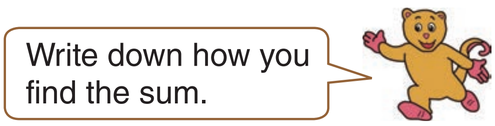
③ Let's think about other ways of finding the sum of angles and discuss.

In any pentagon, the sum of 5 angles is 540°.

9 A hexagon is a six sided figure.

Let's explore how to find the sum of 6 angles in a hexagon.



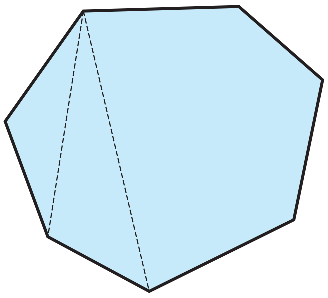


In any hexagon, the sum of 6 angles is ☐°.

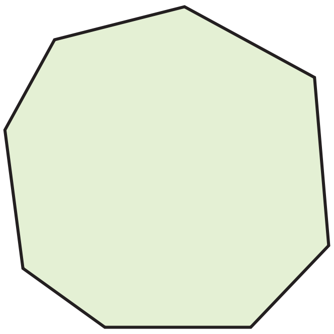
A shape which is enclosed by straight lines, such as a triangle, quadrilateral, pentagon, hexagon, etc., is called a polygon.
In a **polygon**, each straight line that connects any two vertices other than adjacent sides is called a **diagonal**.

10 Summarise the relationships for the sum of angles in polygons by filling in the table below.

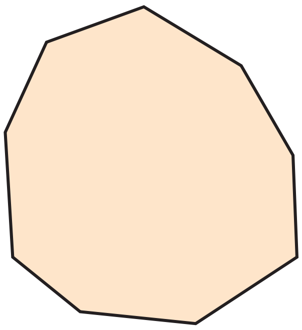
	Triangle	Quadrilateral	Pentagon	Hexagon	Heptagon	Octagon	Nonagon
The number of triangles made by the diagonals from one vertex in a polygon		2	3	4			
The sum of angles	180°	360°	540°	720°			



Heptagon



Octagon

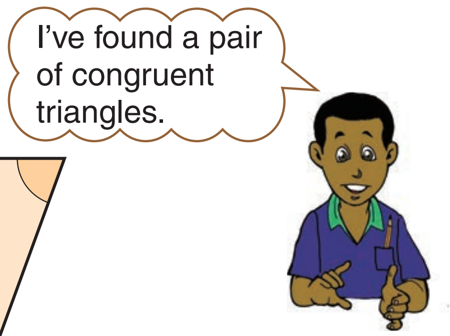


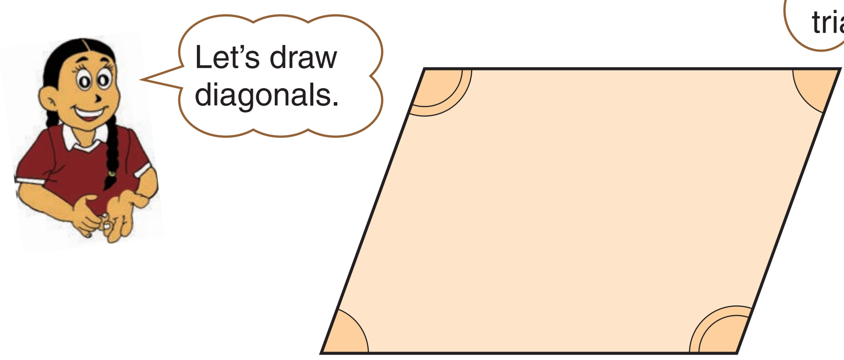
Nonagon

180° × □ = □ °　　180° × □ = □ °　　180° × □ = □ °

The Opposite Angles of a Parallelogram

11 Let's use what you have learned to explain that the opposite angles of a parallelogram are equal.



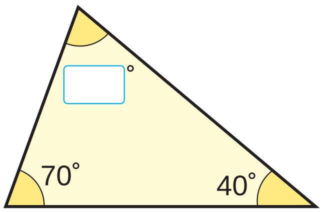


EXERCISE

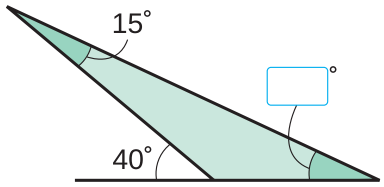
1 Let's calculate and fill in the ☐ with numbers.

Pages 49 to 54

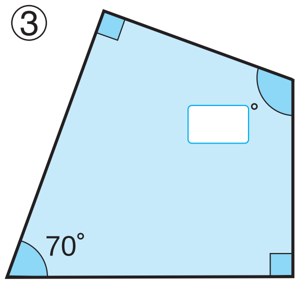
①



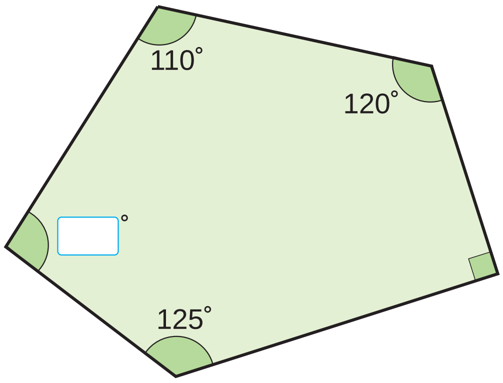
②



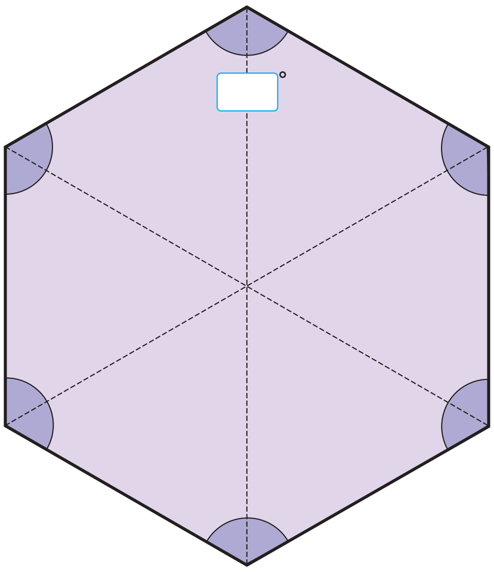
③



④



⑤ A hexagon is developed by 6 equilateral triangles.



Grade 4

Do you remember?

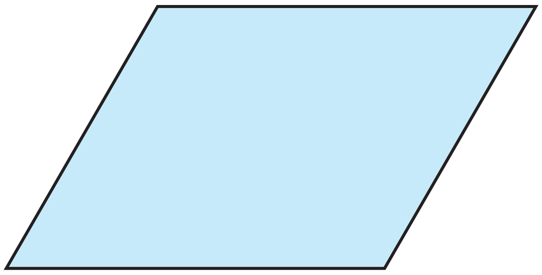
Let's calculate.

① 24 ÷ 2	② 69 ÷ 3	③ 96 ÷ 4
④ 44 ÷ 11	⑤ 72 ÷ 12	⑥ 92 ÷ 23
⑦ 168 ÷ 3	⑧ 675 ÷ 9	⑨ 464 ÷ 8
⑩ 288 ÷ 48	⑪ 333 ÷ 37	⑫ 969 ÷ 17

PROBLEMS

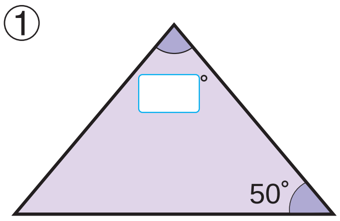
1 Let's draw a congruent quadrilateral to the one below.

● Constructing a congruent quadrilateral.

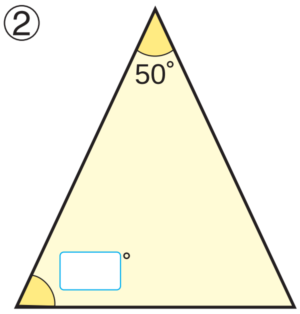


2 Let's fill in the □ with numbers.

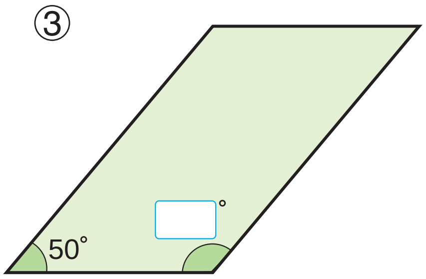
● Using the sum of angles in a polygon.

①


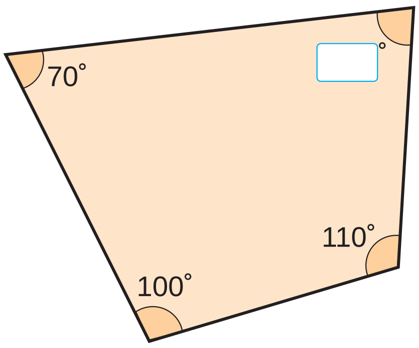
Isosceles triangle

②


Isosceles triangle

③


Parallelogram

④


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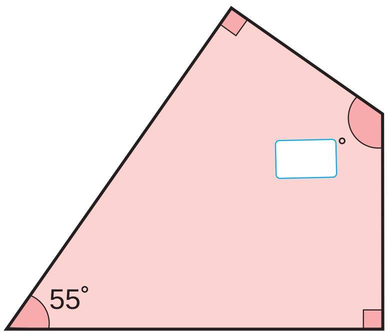
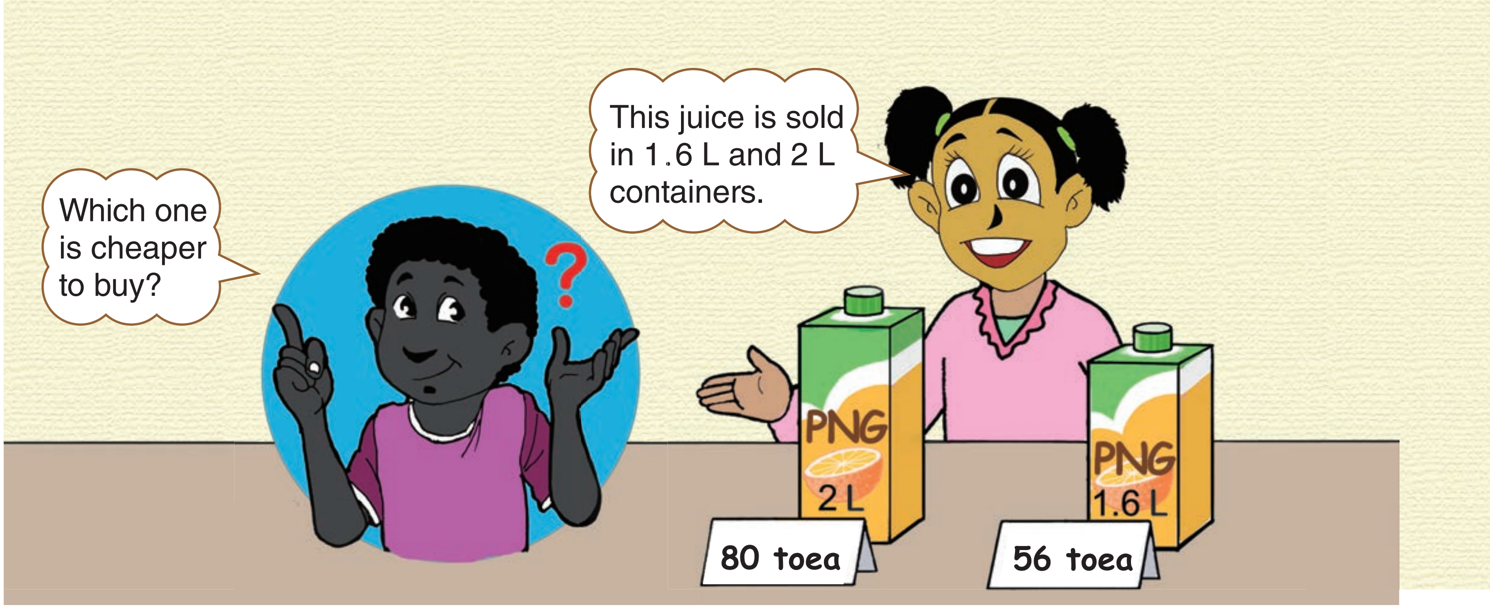


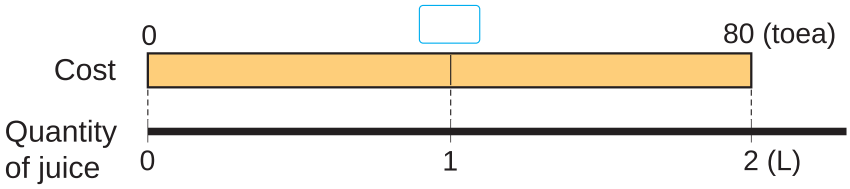
5 Division of Decimal Numbers



1 Operation of Whole Numbers ÷ Decimal Numbers

1 Jane and Betu went to the supermarket to buy juice.

① How much is the cost of 1 L in the 2 L container?



Ⓐ Write a mathematical expression.

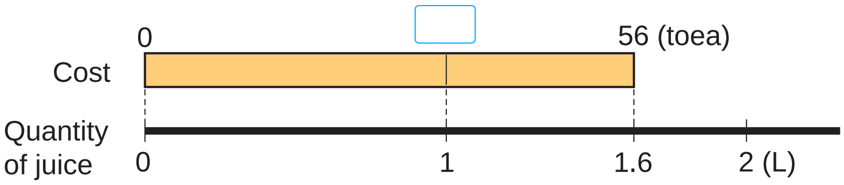
÷ □

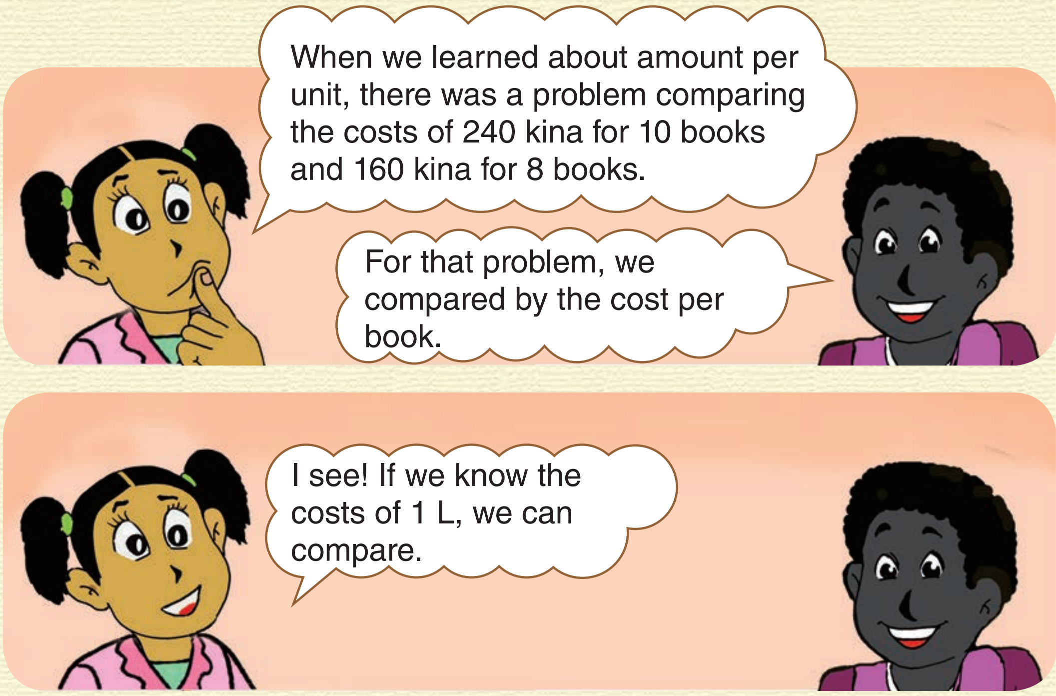
Cost (Kina)	?	80
Quantity of juice (L)	1	2

÷2

Ⓑ Let's calculate the mathematical expression in Ⓐ

② How much is the cost of 1 L for the 1.6 L container?





Ⓐ Write a mathematical expression.

÷ □

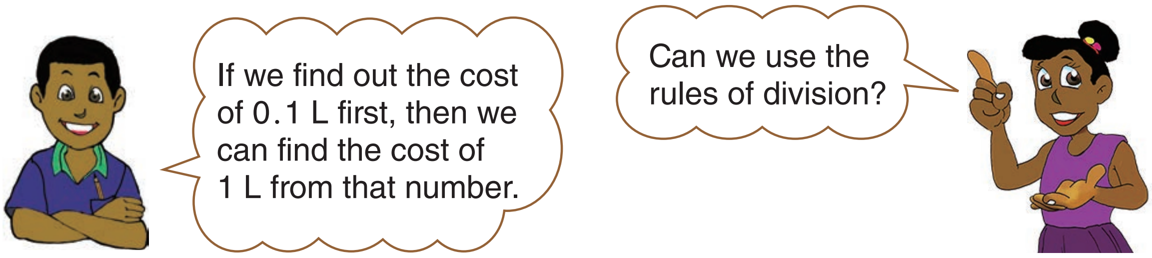
Cost (toea)	?	56
Quantity of juice (L)	1	1.6

÷1.6

Ⓑ Approximately how much would the cost be?

As shown with the quantity of juice, when the divisor is a decimal number instead of a whole number, the expression is the same as for division of whole numbers and means to calculate the quantity per unit.

Ⓒ Let's think about how to calculate $56 \div 1.6$

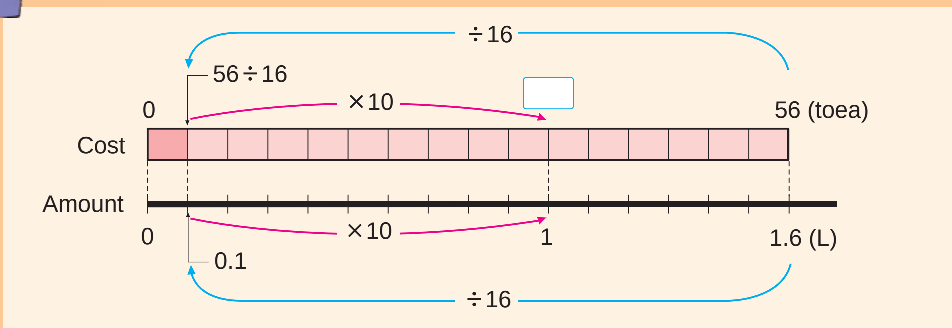


Activity

Ⓓ Let's explain the ideas below.

Mero's Idea

Cost of 1.6 L is 56 toea.
1.6 L is 16 sets of 0.1 L so,
Cost of 0.1 L is 56 ÷ 16 = 3.5 (toea)
10 times of 0.1 L is the cost of 1 L, so
Cost of 1 L is 3.5 × ☐ = ☐ (toea)



Kekeni's Idea

If I buy juice 10 times of 1.6 L, the price will also become 10 times more. However, the cost per 1 L is the same.

Cost of 1 L when I buy 1.6 L of juice   56 ÷ 1.6 = ☐ (toea)

×10 ↓ ↓ ×10

Cost of 1 L when I buy 16 L of juice   560 ÷ 16 = 35 (toea)

Ⓔ Which idea corresponds to each of the two tables shown below? Discuss what the two ideas have in common.

①

÷16, ×10

Cost (toea)			56
Quantity (L)		1	1.6

× ☐, ÷ ☐

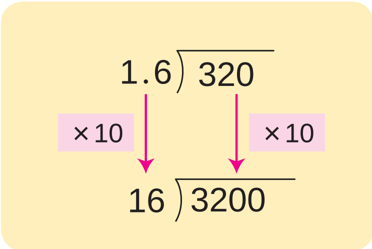
②

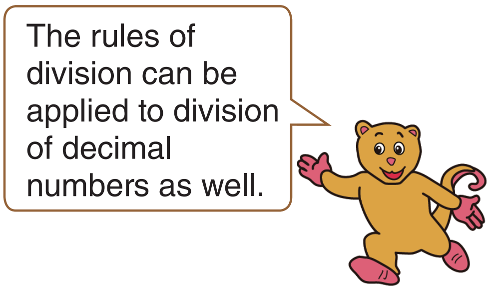
÷16, ×10

Cost (toea)		56	
Quantity (L)	1	1.6	

÷ ☐, × ☐

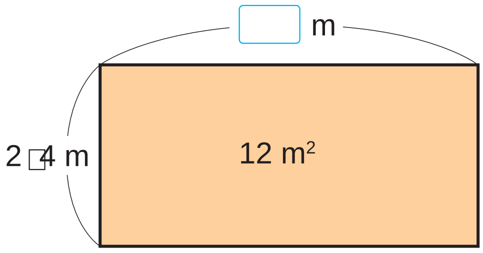
Ⓕ Let's explain how to divide 320 ÷ 1.6 in vertical form.

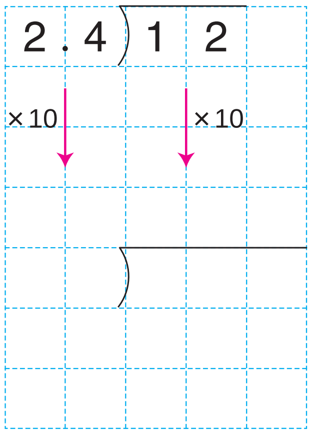




In division, the answer does not change if the dividend and divisor are multiplied by the same number.
When we divide a number by a decimal number, we can calculate by changing the dividend and divisor into whole numbers by using the rule of division.

2 A rectangular flowerbed has a width of 2.4 m and an area of 12 m². How long is the length in metres?





① Let's write a mathematical expression.

② Let's think about how to calculate.

③ Let's think about how to divide in vertical form.

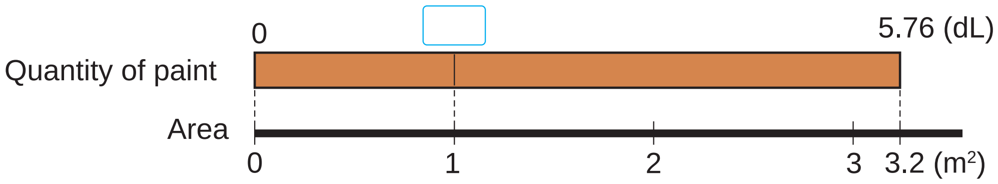
Exercise

Let's divide in vertical form.

① 9 ÷ 1.8　　② 91 ÷ 2.6　　③ 6 ÷ 4.8

2 Operation of Decimal Numbers ÷ Decimal Numbers

1 We used 5.76 dL of paint to paint a 3.2 m² wall.
How many decilitre (dL) of paint will we use to paint a 1 m² wall?



① Let's write a mathematical expression.

[ ]

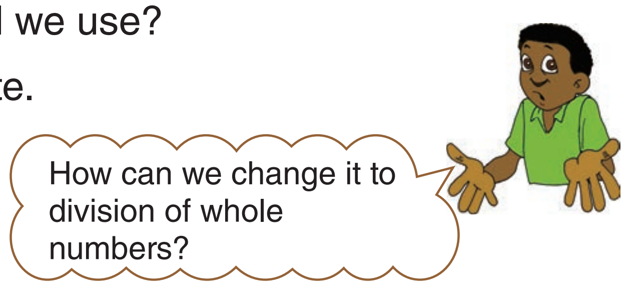
÷ [ ]

Quantity of paint (dL)	?	5.76
Area (m²)	1	3.2

÷3.2

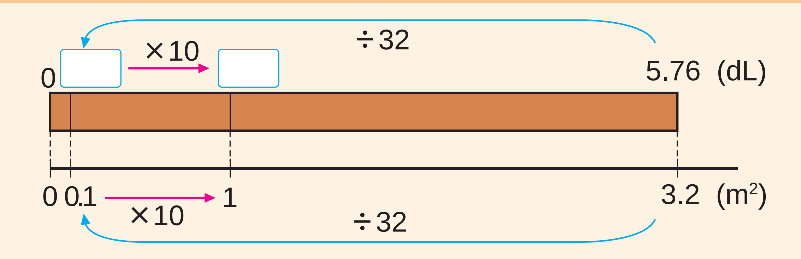
② Approximately how many dL will we use?

③ Let's think about how to calculate.



Naiko's Idea

Paint needed for 0.1 m² is 5.76 ÷ 32 = 0.18 (dL).
Paint needed for 1 m² will be 10 times of that, so 0.18 × 10 = [ ] (dL).



Yamo's Idea

I will apply the rules of division to change the divisor into a whole number.

5.76 ÷ 3.2 = [ ]
×10 ↓ ↓ ×10
57.6 ÷ 32 = [ ]

Activity

4 Let's think about how to divide in vertical form.

$3.2 \overline{)5.76}$

How to Divide Decimal Numbers in Vertical Form

① Multiply the divisor by 10, 100 or more to make it a whole number and move the decimal point to the right accordingly.

② Multiply the dividend by the same amount as the divisor and move the decimal point to the right accordingly.

③ The decimal point of the answer comes at the same place as where the decimal point of the dividend has been moved to.

④ Then, calculate as if this is the division of whole numbers.

```
        1.8
3.2 ) 5.7.6
      3 2
      2 5 6
      2 5 6
          0
```

2 There is a rectangular flowerbed that has an area of 8.4 m^2 and the length of 2.8 m. How many metres is the width?

1 Let's write a mathematical expression.

2 Let's calculate ① in vertical form and find the answer.

Exercise

Let's divide in vertical form.

① 9.52÷3.4	② 9.88÷2.6	③ 7.05÷1.5
④ 8.5÷1.7	⑤ 7.6÷1.9	⑥ 9.2÷2.3

3 A metal bar is 1.5 m and weighs 4.8 kg.
How many kilograms (kg) will 1 m of this bar weigh?

1 Let's write a mathematical expression.

☐

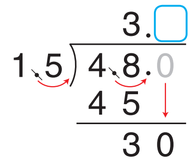
Weight (kg)	?	4.8
Length (m)	1	1.5

(÷1.5 above and below, from 1.5 to 1 and from 4.8 to ?)

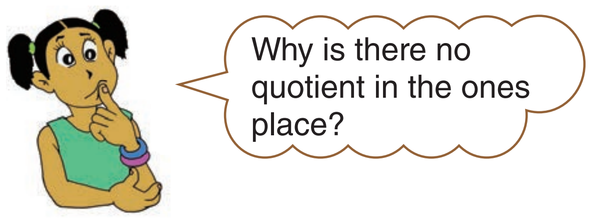
2 Let's think about how to calculate.

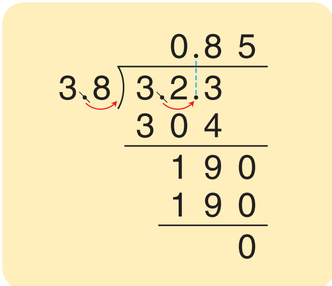
Ⓐ By what number should we multiply the divisor and the dividend?

Ⓑ Think of 48 as 48.0 to continue with the division.



4 Let's think about how to divide 3.23÷3.8 in vertical form.





Exercise

1 Let's divide in vertical form.

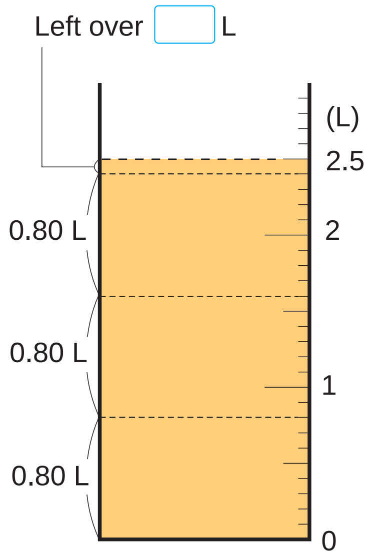
① 36.9÷1.8 ② 3.06÷4.5 ③ 0.49÷3.5

2 There is a rectangular flowerbed that has an area of 36.1 m^2.
How many m is the width if the length is 3.8 m?

3 Division Problems

Division with Remainders

1 I had 2.5 L of juice and poured 0.8 L into each bottle.
How many bottles of 0.8 L of juice do I have now? How many Litres (L) of juice is left over?



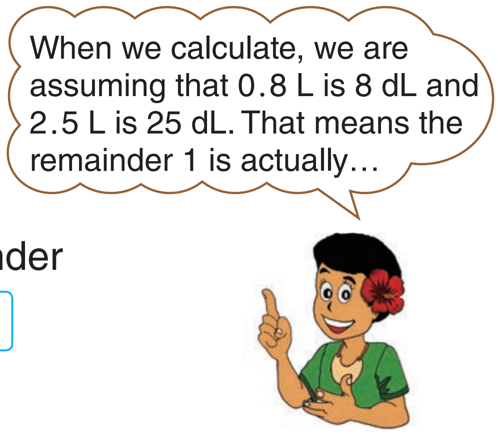
① Let's write a mathematical expression.

☐

② The calculation is shown on the right.
If the left over is 1 L in this case, what will happen?
Write down what you think.

$$
\begin{array}{r}
3. \\
0.8\,\overline{)\,2.5.} \\
\underline{2\;4} \\
1
\end{array}
$$

③ Where should we put the decimal point of the remainder?



Dividend = Divisor × Quotient + Remainder

2.5 = 0.8 × 3 + ☐

In division of decimal numbers, the decimal point of the remainder comes at the same place as the original decimal point of the dividend.

$$
\begin{array}{r}
3. \\
0.8\,\overline{)\,2.5.} \\
\underline{2\;4} \\
0.1
\end{array}
$$

Exercise

A 8 kg of rice is divided into bags of 1.5 kg.
How many bags of 1.5 kg rice will be filled and how many kg of rice will be left over?

2 I weighed a 2.4 m long metal bar and it weighed 2.84 kg.
How many kg does 1 m of this bar weigh?

① Let's write an expression.

[ ]

② The calculation carried out is shown on the right.
What will be the answer?

```
          1.1 8 3
     ____________
2.4 ) 2.8.4
      2 4
      ---
        4 4
        2 4
        -----
        2 0 0
        1 9 2
        -------
            8 0
            7 2
        -------
              8
```

③ Round the quotient to the thousandths place and give the answer to the nearest hundredth.

When a remainder is not divisible by the divisor or when the numbers become too long, the quotient is rounded.

Exercise

1 For answering the quotient at the nearest hundredths place, round the quotient to the thousandths place.

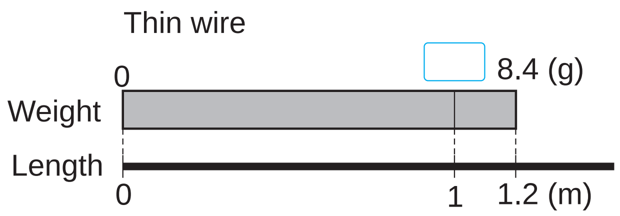
① $2.8 \div 1.7$ ② $5 \div 2.1$ ③ $9.4 \div 3$

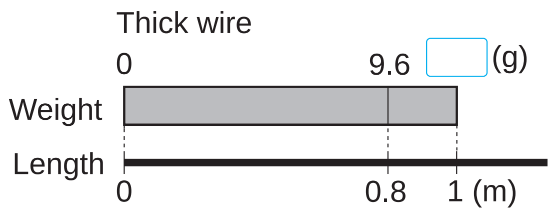
④ $61.5 \div 8.7$ ⑤ $0.58 \div 2.3$ ⑥ $19.2 \div 0.49$

2 A 0.3 m wire weighs 1.6 g. Approximately, how many g does 1 m of this wire weighs? For answering the quotient at the nearest tenths place, round the quotient to the hundredths place.

Dividing by Decimal Numbers Smaller than 1

3 There is a thin wire that is 1.2 m long which weighs 8.4 g and a thick wire that is 0.8 m long and weighs 9.6 g.
Let's find the weight of 1 m for each wire.





① How many g does 1 m of the thin wire weigh? Write an expression and calculate it. [ ]

② How many g does 1 m of the thick wire weigh? Write an expression and calculate it. [ ]

③ Let's compare the quotients and dividends of each of them.

④ Let's calculate 9.6÷[ ] by putting numbers into the [ ] apart from 0.8 Let's talk about what you noticed.

9.6÷1=[ ]	9.6÷0.6=[ ]	9.6÷0.2=[ ]
9.6÷0.9=[ ]	9.6÷0.5=[ ]	9.6÷0.1=[ ]
9.6÷0.8=12	9.6÷0.4=[ ]	
9.6÷0.7=[ ]	9.6÷0.3=[ ]	

When a number is divided by a number smaller than 1, the quotient becomes larger than the dividend.

Exercise

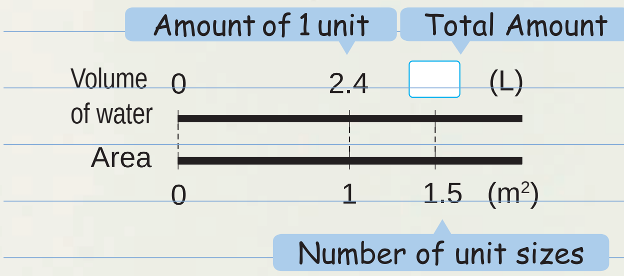
Let's divide in vertical form.

① 4.9÷0.7	② 3.2÷0.4	③ 1.5÷0.3
④ 0.9÷0.6	⑤ 0.4÷0.5	⑥ 0.2÷0.8

4 What Kind of Calculation Would It Be? Draw Diagrams to Help You Think

1 Minie watered a 1 m^2 flowerbed with 2.4 L of water.
How many L of water will she use to water a 1.5 m^2 flowerbed?

Estimation : Water needed for 1.5 m^2 will probably be more than the water for 1 m^2.



× [ ]

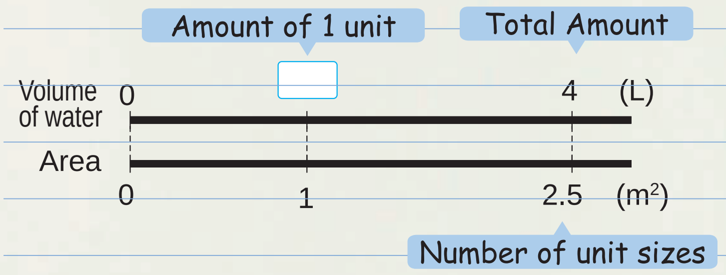
Volume of water (L)	2.4	?
Area (m^2)	1	1.5

×1.5

Expression : 2.4 [ ] 1.5 = [ ]　　Answer [ ] L

2 Jack used 4 L of water to water 2.5 m^2.
How many L will he use to water 1 m^2?

Approach : We want to know the amount of 1 unit size, so we use division.



÷ [ ]

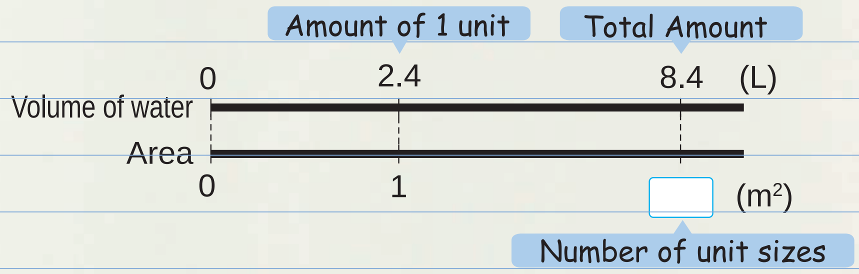
Volume of water (L)	?	4
Area (m^2)	1	2.5

÷2.5

Expression : [ ] ÷ [ ] = [ ]　　Answer [ ] L

3 Lyn used 2.4 L of water to water 1 m^2 flowerbed.
How many m^2 can she water with 8.4 L?

Approach : Use the amount of 1 unit size to calculate the number of unit sizes.



Volume of water (L)	2.4	8.4
Area (m^2)	1	?

÷ 24, ÷ □

Expression : □ Answer □ m^2

4 Ben wrote the following questions.

There is a solar panel that weighs 2.5 kg for 1 m^2.
The weight of 3.8 m^2 of this panel is □ kg.
Let's fill in the □ with an appropriate number.

1. Fill in the □.
2. Let's make a multiplication problem by changing the numbers and words.
3. Let's make a division problem by changing the numbers and words.

EXERCISE

1 Let's divide in vertical form. Pages 58 to 69

① 12÷1.5 ② 36÷1.8 ③ 40÷1.6
④ 7.2÷2.4 ⑤ 9.8÷1.4 ⑥ 8.1÷2.7
⑦ 7.2÷0.9 ⑧ 8.4÷0.6 ⑨ 0.3÷0.8
⑩ 9.1÷3.5 ⑪ 5.4÷1.2 ⑫ 2.2÷5.5
⑬ 0.87÷0.6 ⑭ 14.8÷1.6 ⑮ 0.12÷0.48

2 Let's find the quotient within whole numbers and give also the remainders. Pages 65 and 66

① 9.8÷0.6 ② 6.23÷0.23 ③ 9.72÷1.6

3 I poured 3.4 L of juice into cups of 0.8 L each. How many cups of 0.8 L juice will I have and how many L of juice will be left over? Pages 58, 59 and 65

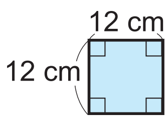
4 For answering the quotient to the nearest hundredths place, round the quotient to the thousandths place. Page 66

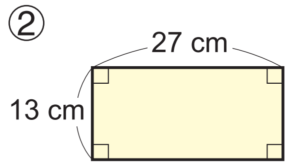
① 0.84÷1.8 ② 5.18÷2.4 ③ 8.07÷0.96

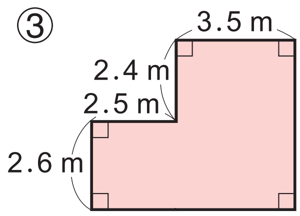
5 There is a wire 0.7 m long that weights 5.8 g.
About how many g will 1 m of this wire weigh?
To answer the quotient at the nearest tenths place, round the quotient to the hundredths place. Page 67

Grade 4
Do you remember?

Let's find the area of the following figures.

①


②


③


PROBLEMS

1 Let's divide in vertical form.

● Dividing decimal numbers by decimal numbers.

① 39.1÷1.7　② 6.5÷2.6　③ 29.4÷0.3

④ 4.23÷1.8　⑤ 0.99÷1.2　⑥ 0.15÷0.08

2 There is a rectangular flowerbed that is 17.1 m^2 and the length is 3.8 m.

What is the width in metres?

● Calculating the length of sides from the area.

3 We distributed 3 L of milk into 0.18 L per cup.

How many cups can we fill? How many litres of milk will be left over?

● Calculating the decimal number with remainder.

4 4.5 L of paint weighed 3.6 kg.

What are the meanings of the following expressions?

● Considering relationship between the dividend and the divisor.

① 4.5÷3.6　② 3.6÷4.5

5 Which is greater?

Let's fill in the □ with inequality signs.

● Understanding the relationship between the divisor and the quotient.

① 125÷0.8 □ 125　② 125÷1.2 □ 125

6 Let's explain how to calculate 6.21÷2.3

Why did you calculate like that?

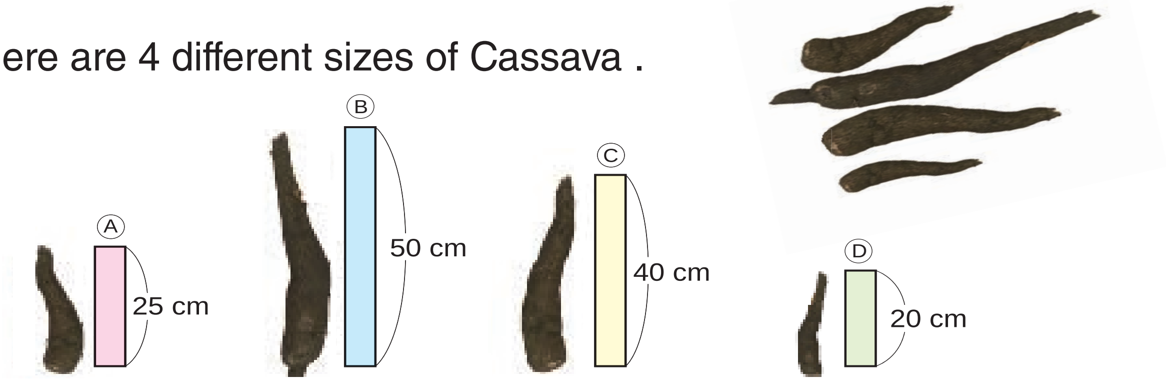
Let's write the reasons which you used.

● Using calculation rules to explain.

Calculation of multiples

Comparing Lengths

1 There are 4 different sizes of Cassava .



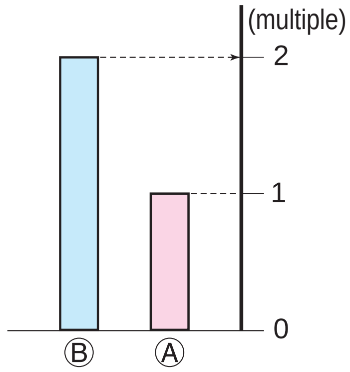
① By how many times is the length of Ⓐ compared to Ⓑ?

50 ÷ 25 = ☐

Length of Ⓑ　Length of Ⓐ　Multiple

	Ⓐ	Ⓑ
cm	25	50
Multiples	1	?

÷25　÷25



② By how many times is the length of Ⓐ compared to Ⓒ ?

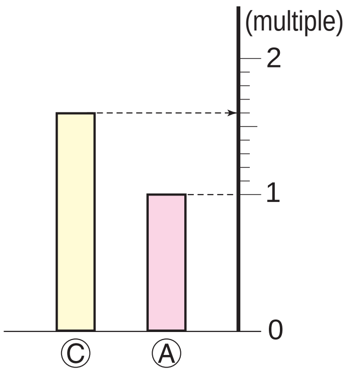
When Ⓒ is measured with Ⓐ there is a remainder.

Thus, we need to express the answer as decimal number by dividing the length between 1 and 2 into 10 equal parts.

☐ ÷ ☐ = ☐

	Ⓐ	Ⓒ
cm	25	40
Multiples	1	?

÷25　÷25



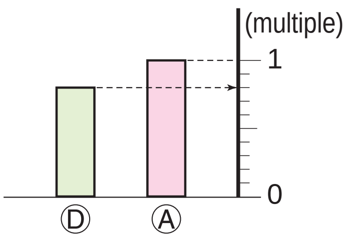
③ By how many times is the length Ⓐ to Ⓓ?

Since Ⓓ is shorter than Ⓐ, this multiple will be a number that is shorter than 1.

☐ ÷ ☐ = ☐

	Ⓐ	Ⓓ
cm	25	20
Multiples	1	?

÷25　÷25



2 We are going to draw pictures of cassava based on cassava Ⓒ.

1 If we draw a cassava twice the height of Ⓒ, what will be the length of the new cassava?

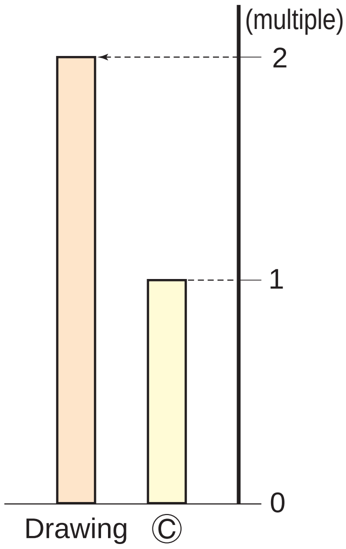
$40 \times 2 = \square$

Length of Ⓒ × Multiple = Length of drawing

× □

cm	40	?
Multiples	1	2

×2



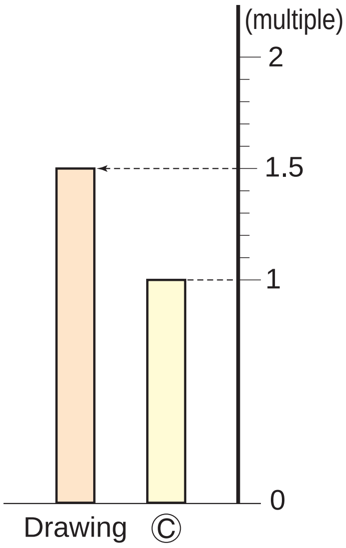
2 To make the drawing of the cassava 1.5 times the length of Ⓒ, how many cm should it be? The length of 1.5 times is when the length between 1 and 2 is divided into 10 equal parts.

$\square \times \square = \square$

× □

cm	40	?
Multiples	1	1.5

×1.5



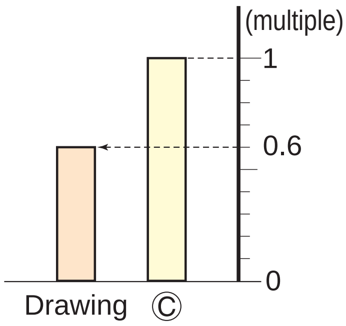
3 To make the drawing of the cassava 0.6 times the length of Ⓒ, how many cm should it be? The length multiplied by 0.6 will become smaller than when it is multiplied by 1, so it will be smaller than the original length.

$\square \times \square = \square$

× □

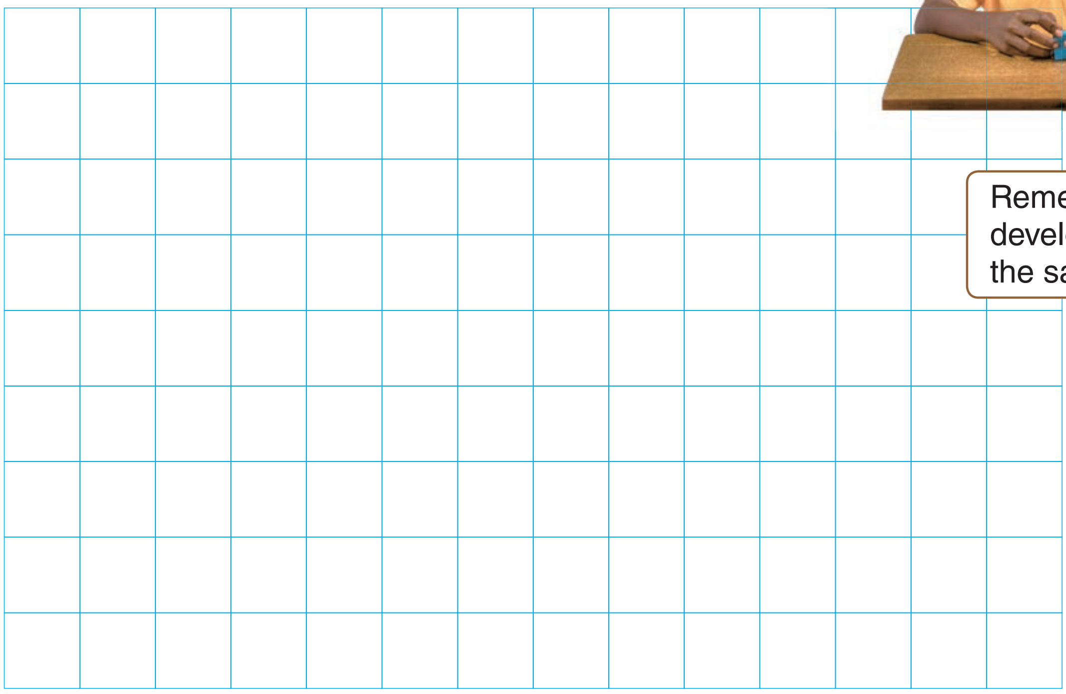
cm	40	?
Multiples	1	0.6

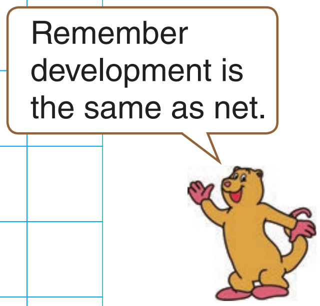
×0.6



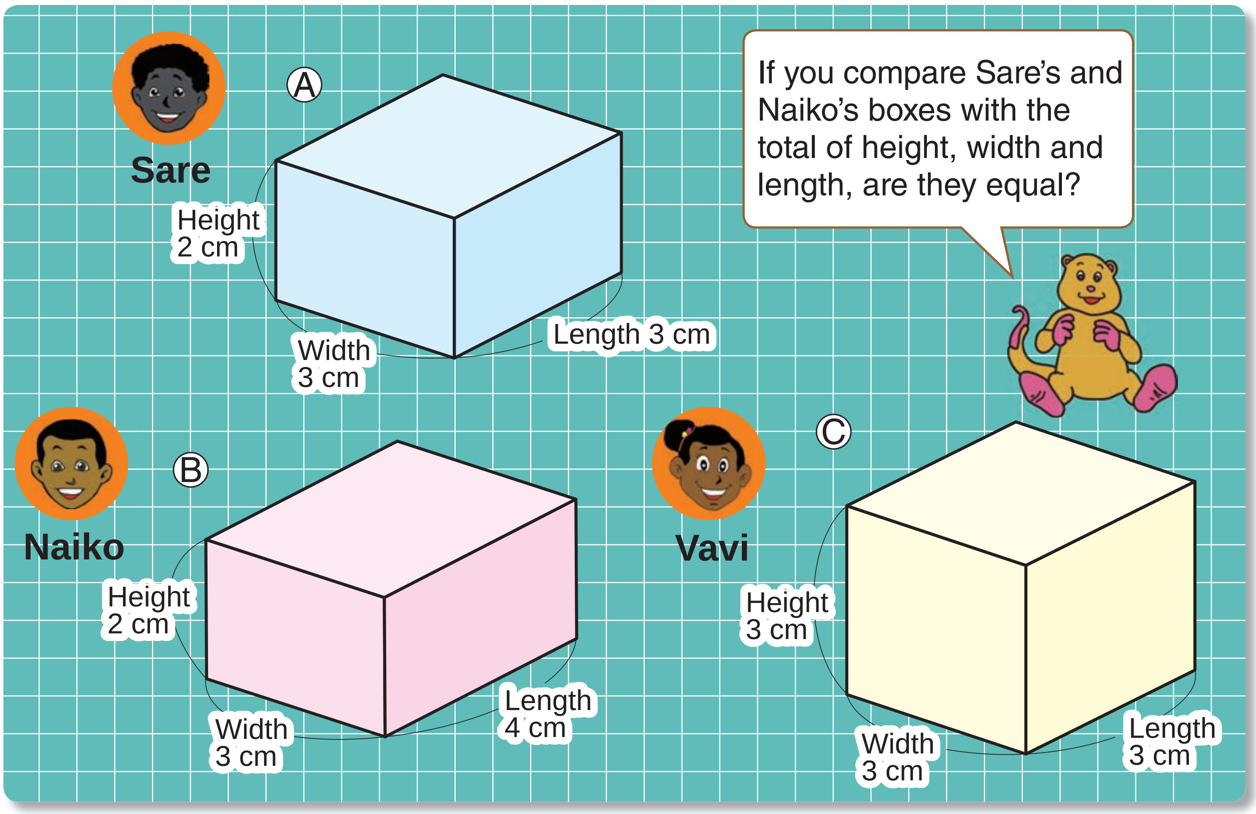
6 Volume

▶▶ Let's draw the development of a rectangular prism and a cube on a squared paper below. How can you make the largest box?



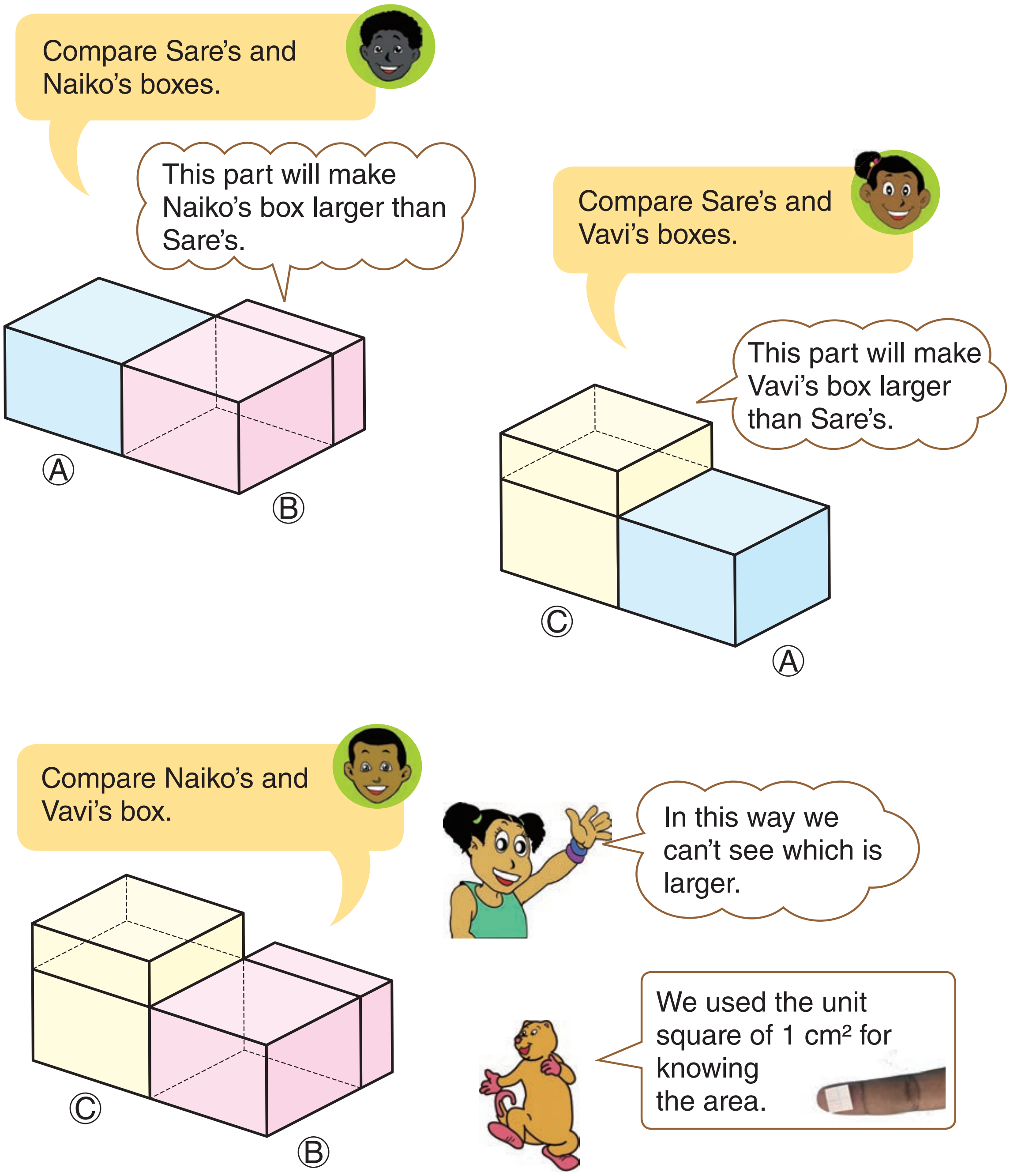


▶▶ Whose box is the largest amongst the three?



1 Volume

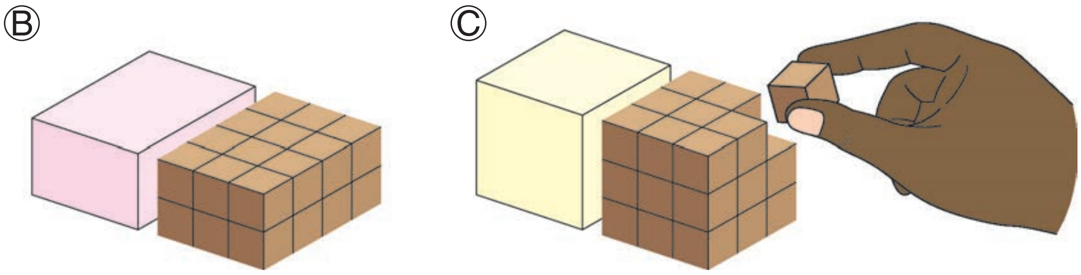
1 Let's compare the sizes of the boxes which the three children prepared.



① Let's think about how to compare the sizes of the boxes.

Let's explore how we can represent the sizes of rectangular prisms and cubes.

② We made the same solids by using 1 cm cubic blocks.
Let's compare the number of cubes needed to make Naiko and Vavi's boxes.

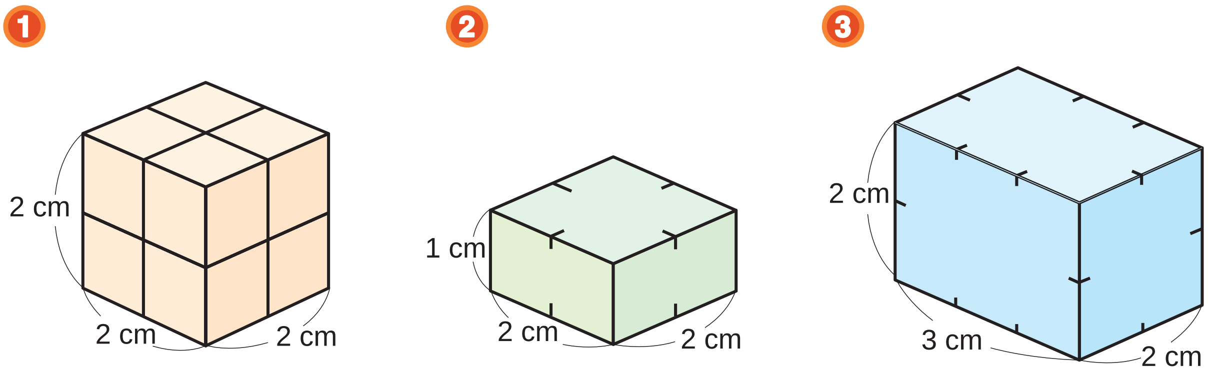


Ⓑ needs ☐ boxes.

Ⓒ needs ☐ boxes.

☐ needs ☐ more boxes.

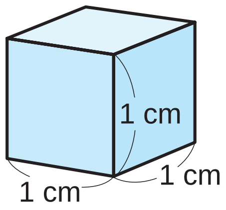
2 How many 1 cm cubes are needed for the following rectangular prism and cube?



The size of a solid represented by a number of units is called **volume**.

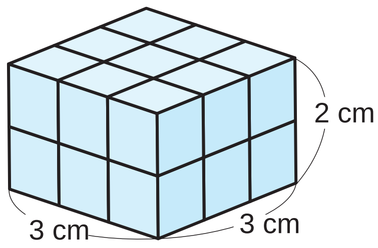
1 cm cube is used as a unit for volume. We represent volume by counting the number of cube units.

The volume of a cube with 1 cm sides is called **1 cubic centimetre** and is written as 1 cm^3.
Cubic centimetre (cm^3) is a unit of volume.

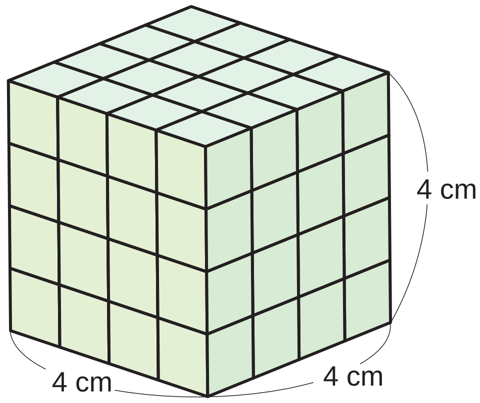


3 Let's find the volume of the following rectangular prism and the cube.

1



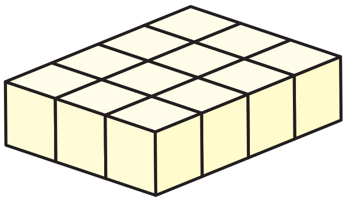
2



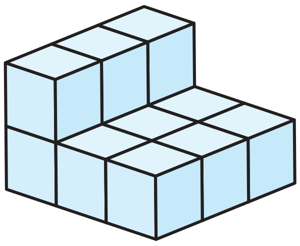
Same Volume

Use 12 cubes of 1 cm^3 and make different shapes.

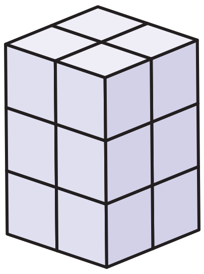
Ⓐ



Ⓑ

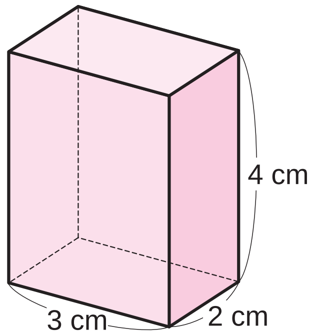


Ⓒ



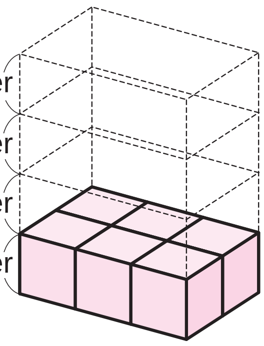
2 Formula for Volumes

1 Let's think about how to find the volume of the rectangular prism on the right.



① How many 1 cm^3 cubes are on the bottom layer?

② How many layers are there?



③ How many 1 cm^3 cubes are there and what is its volume?

$3 \times 2 \times 4 = \square$

3	2	4	$\square$
Number of length	Number of width	Number of height	Total number

The number of cubes used in length is equal to length, the number of cubes used in width is equal to width and the number of cubes used in height is equal to height respectively.

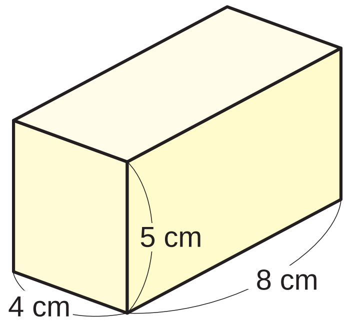
$3 \times 2 \times 4 = \square$ (cm^3)

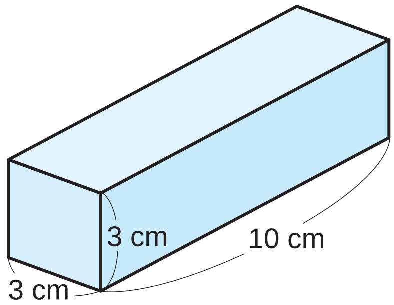
3	2	4	$\square$
Length	Width	Height	Volume

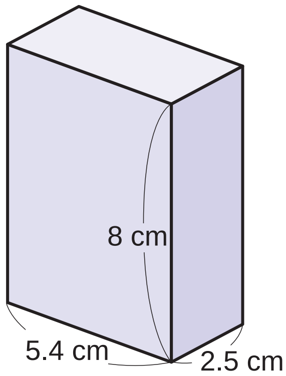
The volume of a rectangular prism is expressed in the following formula using length, width and height.

Volume of rectangular prism = length × width × height

2 Let's find the volume of the following prisms below.

①


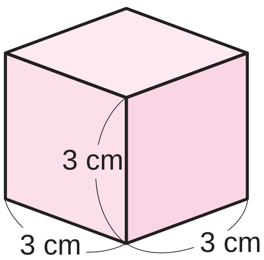
②


③


3 Let's find the volume of this cube.

① How many 1 cm^3 cubes are there in this cube?

② What is the volume?

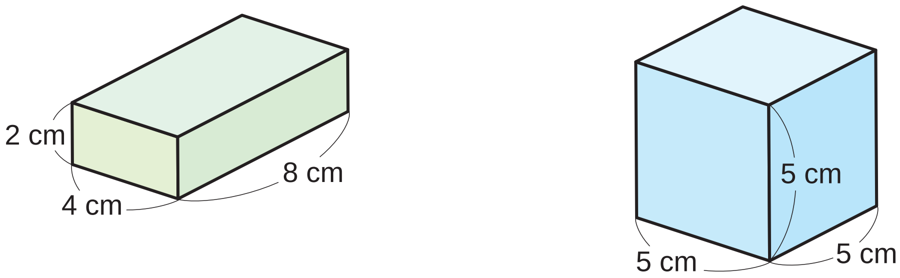


Since the size of length, width and height of cube are equal, its formula is the following:

Volume of cube = side × side × side

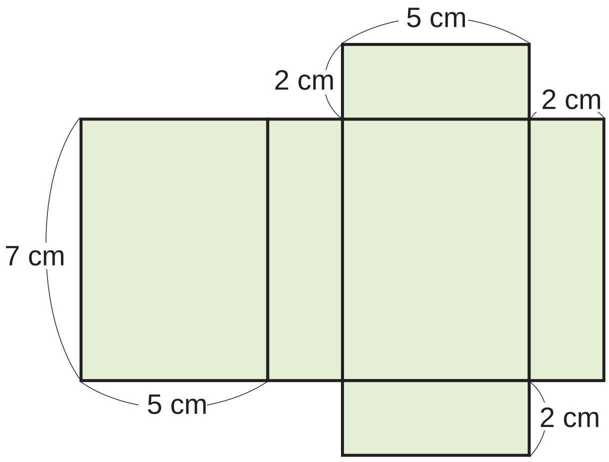
Exercise

1 Let's find the volumes of the rectangular prism and the cube below.



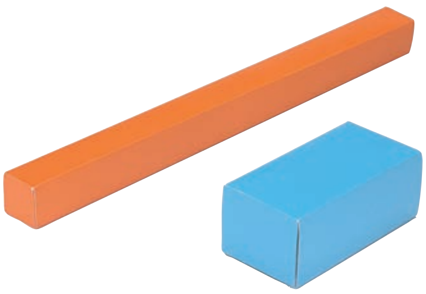
2 Let's find the volumes of rectangular prisms and cubes from your surroundings.

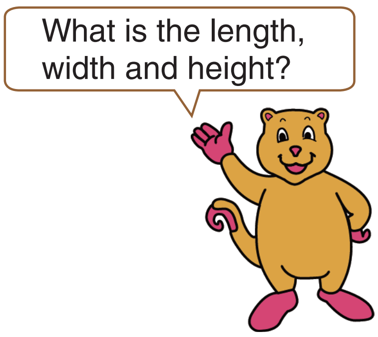
4 Fold the development below and find the volume.



Let's Make a Box of 200 cm^3

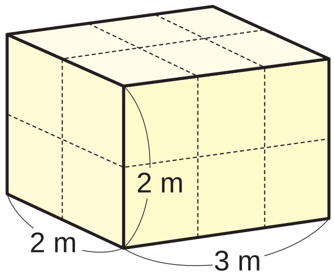
Make several boxes which have a volume of 200 cm^3.





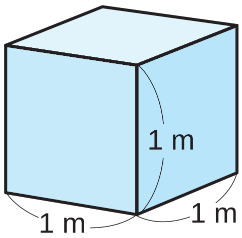
3 Large Volumes

1 Let's think about how to express the volume of a large rectangular prism such as this one.



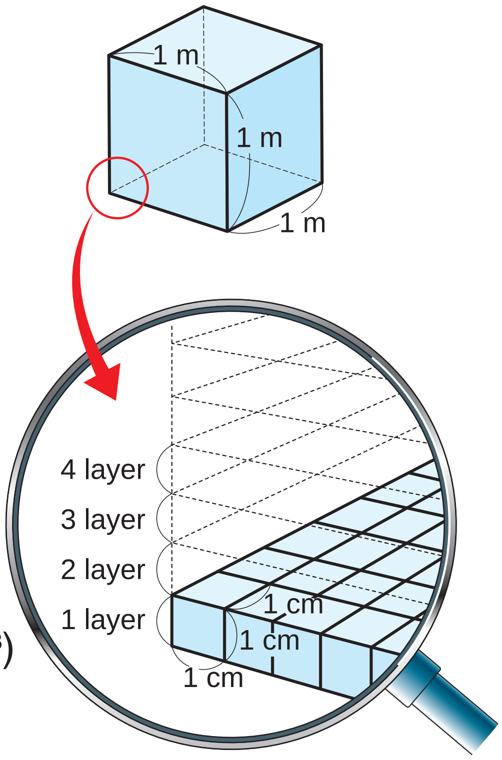
① How many 1 m cubes are in this prism?

The volume of a cube with 1 m sides is called **1 cubic metre** and expressed as 1 m^3.



② What is the volume of the prism in 1 m^3?

2 Let's find how many cm^3 equals to m^3.



① How many 1 cm^3 cubes will line up for the width and the length of 1 m^2 base?

② How many layers of 1 cm^3 are there?

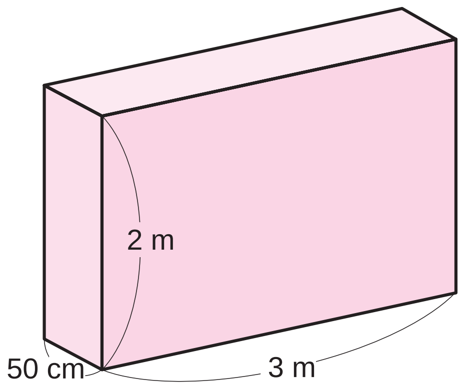
③ What is the total of 1 cm^3 cubes and the volume in cubic centimetre?

100 × 100 × 100 = ☐ (cm^3)

Length　Width　Height　Volume

$1\ m^3 = 1\ 000\ 000\ cm^3$

3 Let's find the volume of the rectangular prism on the right.

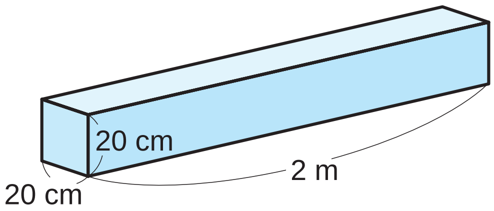


① Think about how to calculate.

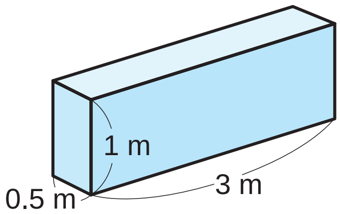
② What is its volume in m^3 and in cm^3 ?

Exercise

1 What is the volume of this rectangular prism?

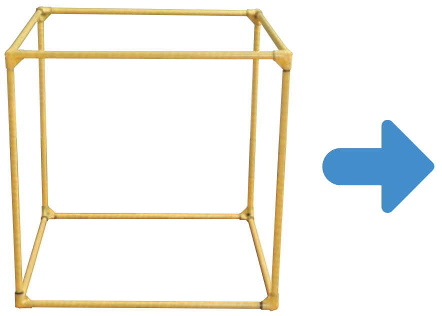


2 Find the volume of this rectangular prism both in m^3 and cm^3.

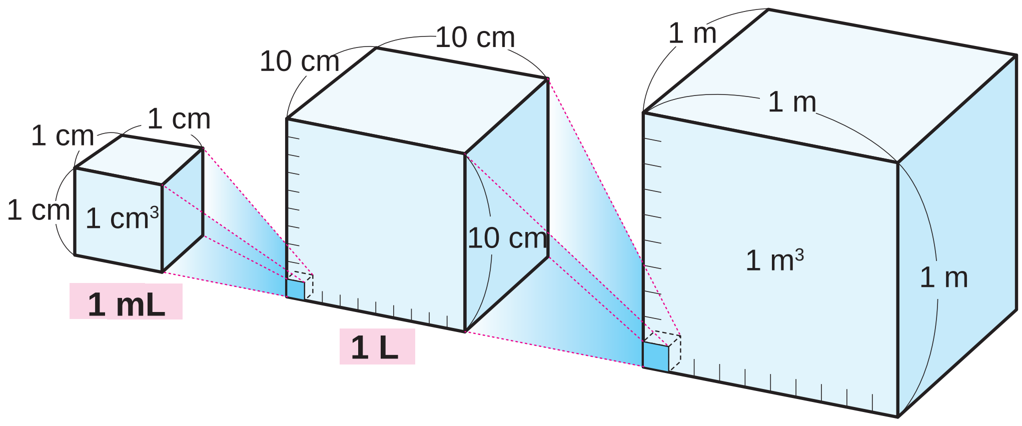


The Volume of 1 m^3 Cube

How many people can get inside this 1 m^3 cube?



4 Let's check the relationship between the amount of water and the volume.



① 1 L equals 1000 mL. How many cm^3 is 1 L?

1 mL = ☐ cm^3

② Find the volume in cm^3 of the water which would fill a 1 L container.

1 L = ☐ cm^3

③ How many L of water will fill a 1 m^3 tank?

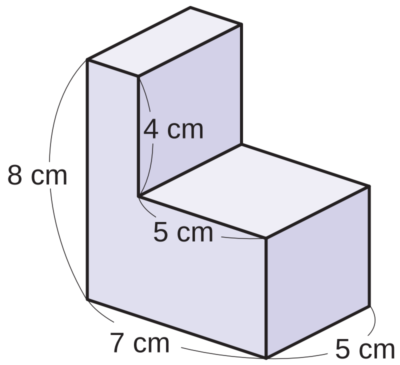
1 m^3 = ☐ cm^3

= ☐ L

The units for the amount of water are expressed by L, dL and mL.

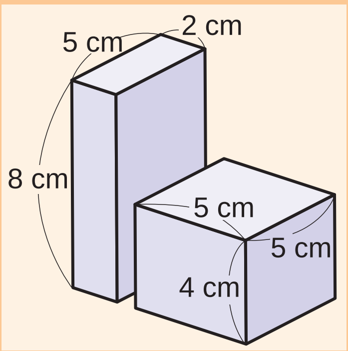
1000 L = 1 m^3　1 dL = 100 cm^3　1 mL = 1 cm^3

5 Let's think about how to find the volume of the solid on the right.

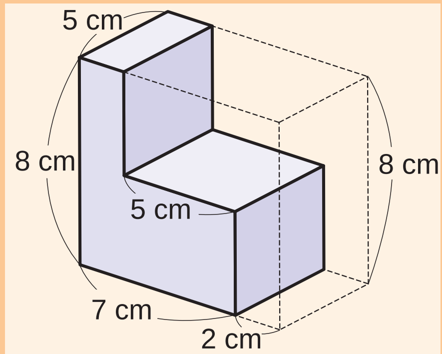


Activity

Gawi's Idea



Ambai's Idea



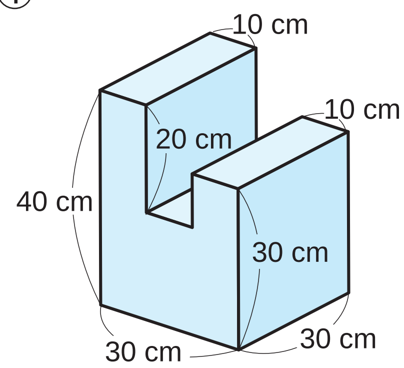
1. Write down expressions and answers by using their ideas.
2. Discuss with your friends about other ideas.

Activity

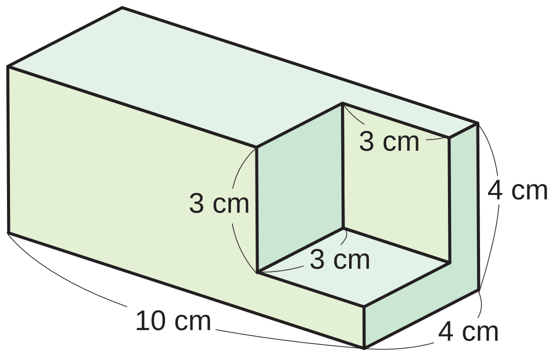
Exercise

Let's find the volume of these solids below.

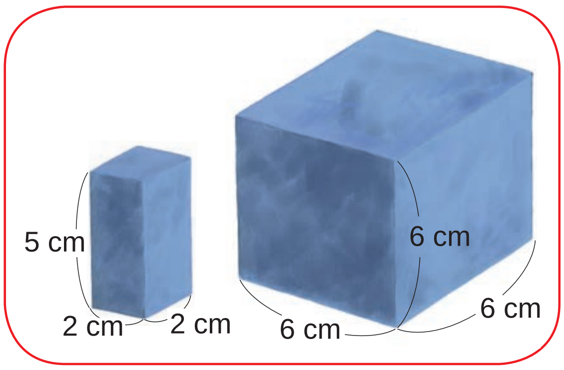
①



②



6 We made an elephant by using a cubic and rectangular prism clay below. Find the volume of the elephant.



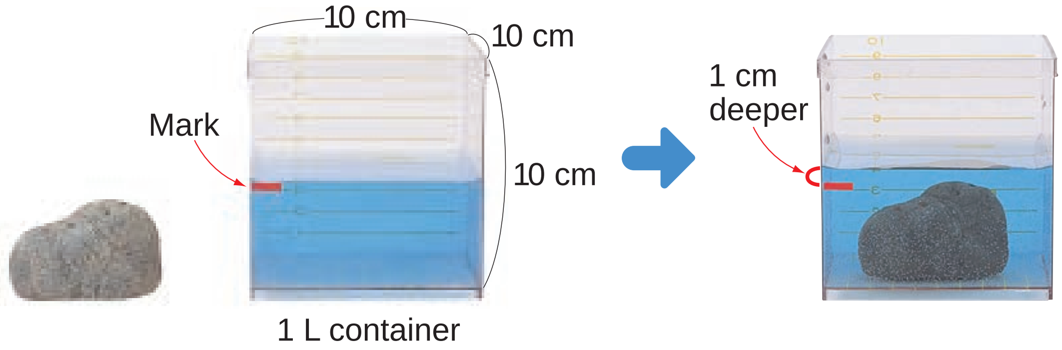
Volumes of Various Shapes

Physical objects have volumes. How can we find the volumes of other objects that are not cubes or rectangular prisms?

For example, an uneven shape such as a rock can be calculated by putting it in the water.

7 When you sink an object in the water, the level of water will be increase by the volume of the object.

Let’s find the volume of the rock below.



8 Let’s measure the volume of various objects.

Let’s think about the ways of using a container to measure the volume easily.

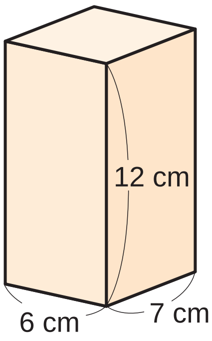
Before the measurement estimate the volume!

EXERCISE

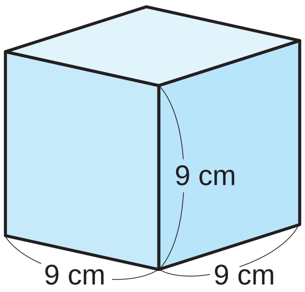
1 Let's find the volume of the rectangular prism and the cube below.

Pages 72, 78 and 79

①

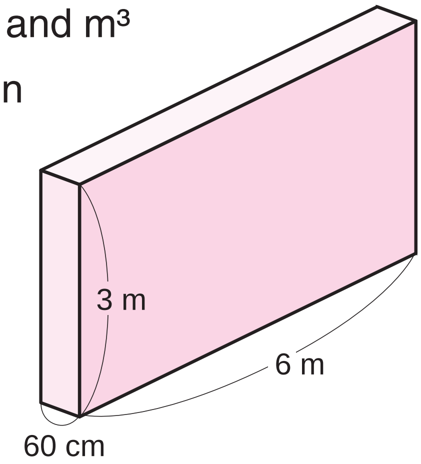


②



2 What is the volume in cm³ and m³ for the rectangular prism on the right?

Pages 81 and 82

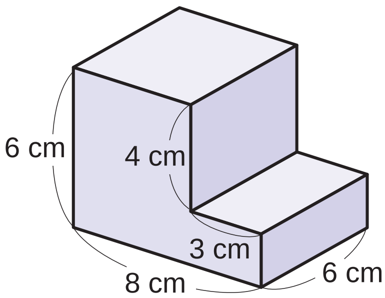


3 What is the volume of 400 L water in cm³ and m³?

Page 83

4 Let's find the volume of the object on the right.

Pages 84 and 85



Grade 5

Do you remember?

Let's calculate.

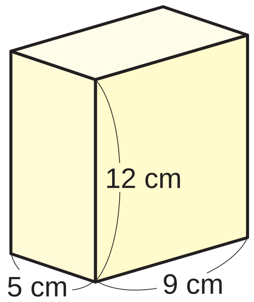
① 30×1.2 ② 5.4×1.2 ③ 2.13×5.4 ④ 0.12×0.5

⑤ 9÷1.5 ⑥ 4.5÷2.5 ⑦ 6.12÷7.2 ⑧ 1.61÷0.7

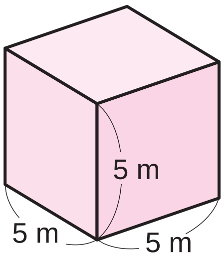
1 Let's find the volume of the following rectangular prism and cube.

● Using the formula.

①



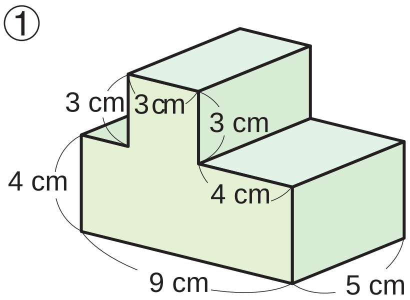
②



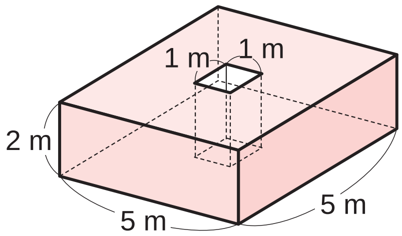
2 Let's find the volumes below.

● Considering the ways.

①

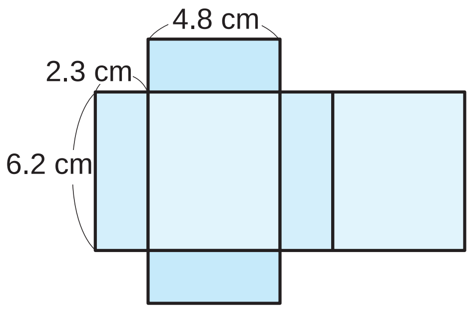


②



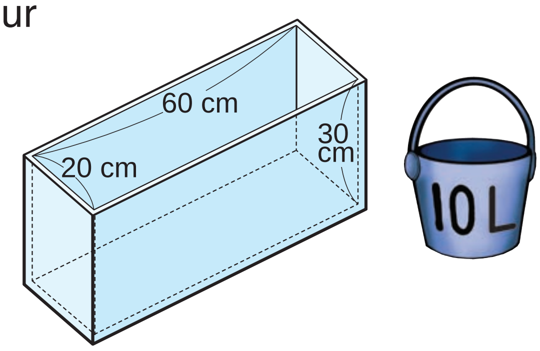
3 Let's find the volume of a prism which could be made by the development on the right.

● Calculating the volume from its development.



4 Let's fill the rectangular prism tank below with water. How many times do you need to pour water with a 10 L bucket?

● Representing the volume of water by various units.



7 Multiples and Divisors

Let's think about number groups.
First, decide the "clap number".

For example, let's decide 3 as "clap number".

Make a circle and say the number in the order from one. When the count numbers is 3, each person claps, every 3rd person claps by saying the "clap number".

Until which number can you continue?

I considered how many students skipped the clap.

I considered to add 3 for every third student that claps.

Activity

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Let's enjoy "Clap Number" game

1 Multiples and Common Multiples

Multiples

1 When the "clap number" is 3, let's consider which numbers will be clapped.

① Write numbers in the table on the right and put colours on the number which will be clapped.

② Put colours on the numbers line below, too.
Let's discuss what the groups of coloured numbers are.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22								

31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

Activity

Multiples of 3 are whole numbers multiplied by 3 like
$3 \times 1, 3 \times 2, 3 \times 3, \dots$.
$3 \times 0 = 0$, but 0 is not a multiple of 3.

2 Clap by multiples of 2.

Let's find the relationship of the numbers clapped.

Circle the clapped numbers on the number line below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

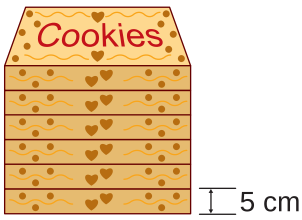
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64

Exercise

1 Stack the boxes of cookies with a height of 5 cm.

① What is the total height of 6 boxes?

② Which multiple gives the total height?



2 Let's write the first 5 numbers of the following multiples.

① Multiples of 8　　② Multiples of 9

How Multiples Make Patterns in Numbers

Circle the multiples of 2 in the table below.
How do the multiples of 2 line up?
Let's check the multiples of other numbers.

Multiples of 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of □

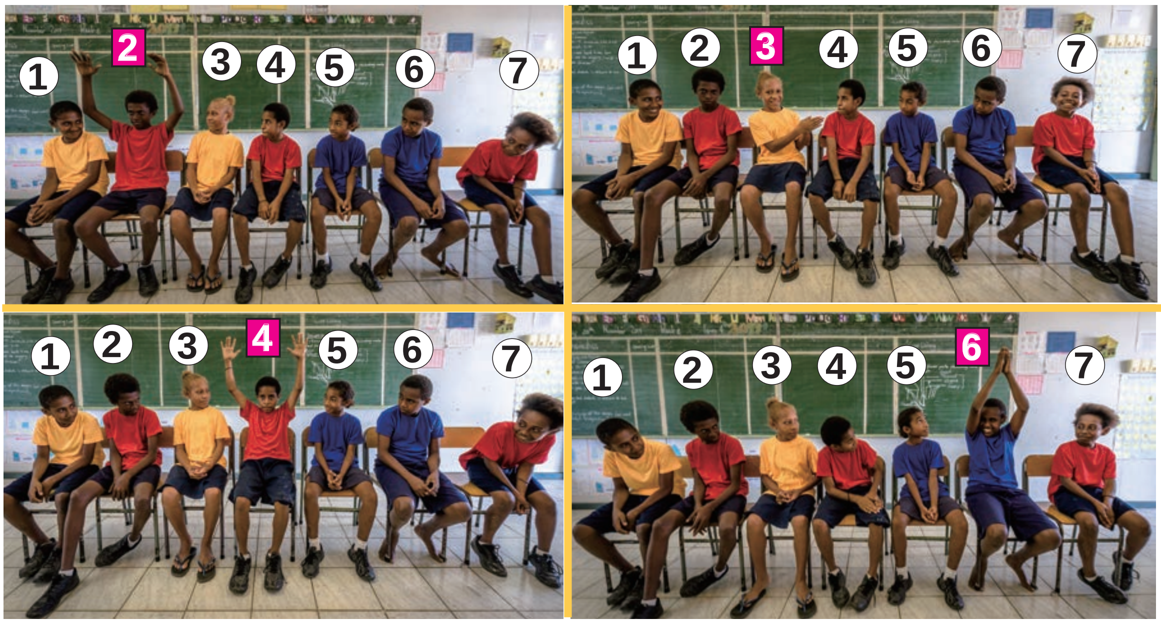
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of □

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Common Multiples

3 Let's play "clap number game" by raising hands at the multiples of 2 and clapping at the multiples of 3.



For 6, raise hands and clap at the same time, right?

Are there any other numbers which students raise hands and clap at the same time like 6?

Multiples of 2

Multiples of 3

Multiples of both 2 and 3

1 2 3 4 5 6 7 8 9 10 11 12 13 14 …

① Let's find numbers that are multiples of both 2 and 3.

A number that is a multiple of both 2 and 3 is called a **common multiple** of 2 and 3. The smallest of all common multiples is called the **least common multiple**.

② What is the number of the least common multiple of 2 and 3?

4 Let's think about how to get the common multiples of 3 and 4. Four friends found different ways to determine the common multiples as follows. Let's read their ideas and describe each method in sentences. Explain the ideas to your friends.

Mero's note

multiples of 3 3, 6, 9, (12), 15, 18, 21, (24), 27, 30, 33, (36)...
multiples of 4 4, 8, (12), 16, 20, (24), 28, 32, (36), 40 ...

I find the common numbers from the multiples of 3 and 4.

Yamo's note

Think about multiples of 3...
then, circle the multiples of 4.

3,	6,	9,	12,	15
×	×	×	○	×
18,	21,	24,	27 ...	
×	×	○	×	

Sare's note

Write the multiples of 4
then, circle the multiples of 3.

4,	8,	12,	16,	20,
×	×	○	×	×
24,	28,	32,	36 ...	
×	×	○	×	

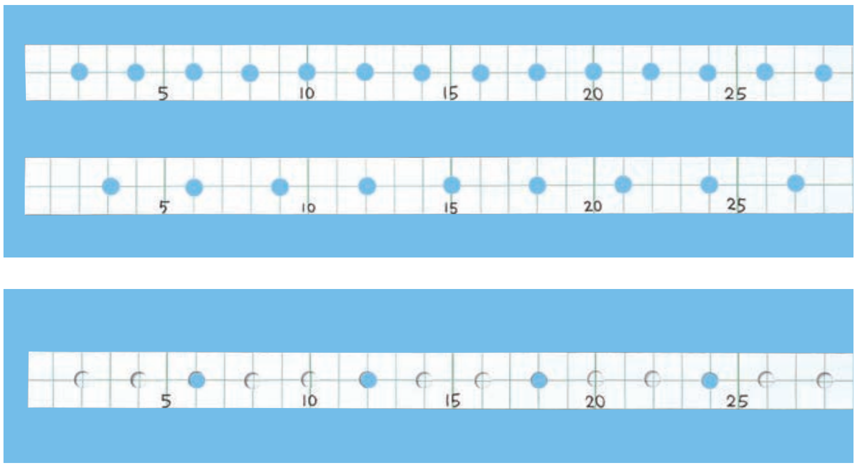
Vavi's note

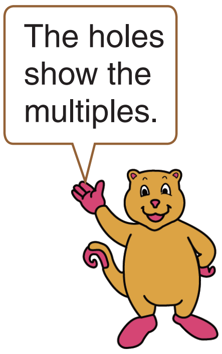
3, 6, 9, (12)
4, 8, (12)

12 × 2 = (24), 12 × 3 = (36)

Making Tapes of Multiples

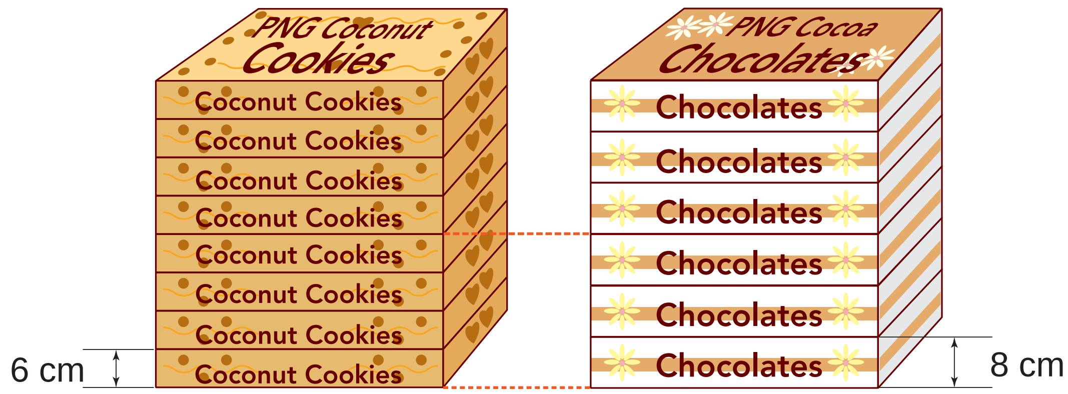
Place the tape of multiples of 2 on top of the tape of multiples of 3. The common multiples of 2 and 3 are where the holes on both tapes overlap.





The least common multiple of 3 and 4 is 12. All common multiples of 3 and 4 are multiples of 12.

5 Stacked are boxes of cookies with a height of 6 cm each and chocolate boxes with a height of 8 cm each.



① The total height of the boxes of cookies are multiples of which number?

② The total height of the chocolate boxes are multiples of which number?

③ What will be the least height that the cookie boxes and chocolate boxes be equal? How many boxes are in each stack?

④ Write the first 3 numbers where the height of both stacks are equal.

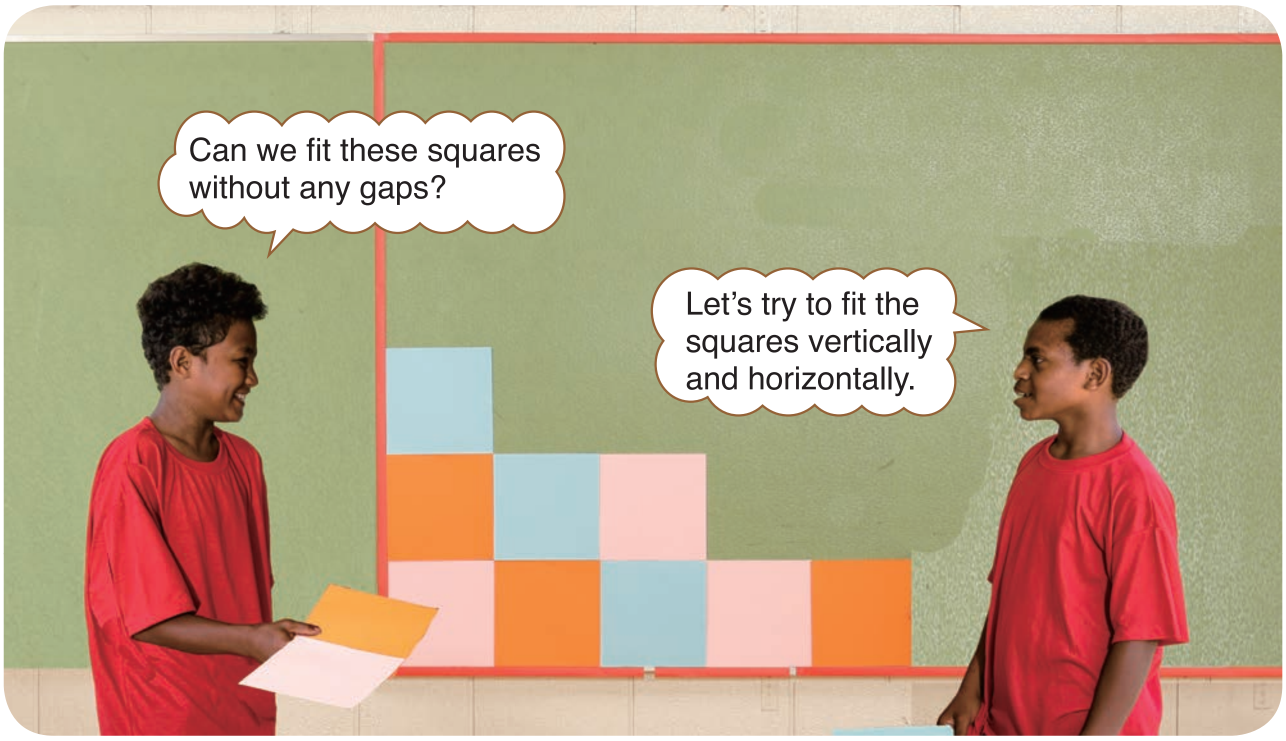
Exercise

1 Write the first 4 common multiples for each of the following groups of numbers. Find the least common multiples.

① (5, 2) ② (3, 9) ③ (4, 6)

2 Stack boxes with heights of 6 cm and 9 cm. What is the smallest number where the total heights of the two stacks are equal?

2 Divisors and Common Divisors

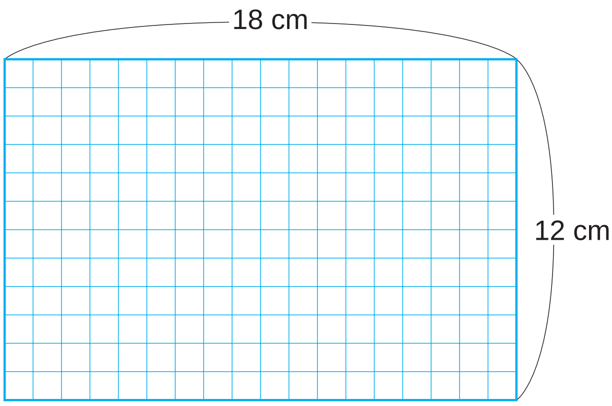


We want to put squares in this frame so there are no gaps.

Let's find out which squares can fit in the frame without any gaps.

Divisor

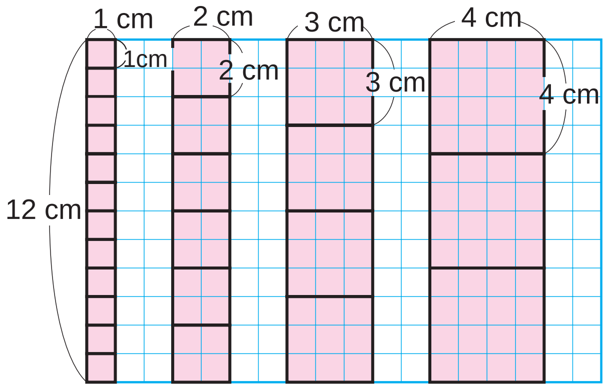
1 Place squares of the same size in a 12 cm × 18 cm rectangle.
How long is each side of the square?



Think of the length of the sides of the squares when the squares are lined up vertically without any gaps.

① How many cm is each side of the squares when they are lined up vertically over a 12 cm length without any gaps?

The lengths of the sides of the squares when lined up vertically over a 12 cm length without any gaps are 1 cm, 2 cm, 3 cm, 4 cm, 6 cm and 12 cm.

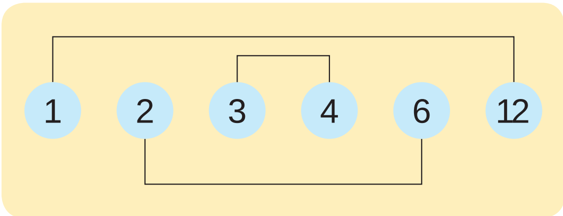


2. Divide 12 by 1, 2, 3, 4, 6 and 12 one by one to confirm that there are no gaps. Are they divisible by 12?

The whole numbers by which 12 can be divided with no remainder are called **divisors** of 12.

1, 2, 3, 4, 6, 12 ……Divisors of 12

3. What can you find when divisors of 12 are grouped as shown below?



$1 \times 12 = 12$

$2 \times 6 = 12$

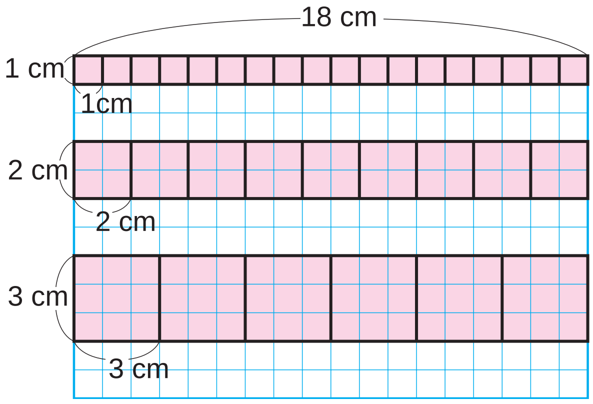
$3 \times 4 = 12$

Any number is divisible by 1 and itself.

Think about the length of the sides of the squares when the squares are lined up horizontally without any gaps.

4. How many cm is each side of the squares when they are lined up horizontally over a 18 cm length without any gaps?

The lengths of the sides of the squares when lined up horizontally over a 18 cm length without any gaps are 1 cm, 2 cm, 3 cm, 6 cm, 9 cm and 18 cm.



18 cm is included because we think only horizontally.

1, 2, 3, 6, 9, 18 ......Divisors of 18

Common Divisors

5 How many cm can the sides of the squares be, when lined up vertically and horizontally without any gaps?

Height...... 1 2 3 4 6 12 (cm)

Width...... 1 2 3 6 9 18 (cm)

We get squares when the width and height are equal.

The numbers that are divisors of both 12 and 18 are called **common divisors** of 12 and 18. The largest of all common divisors is called **greatest common divisor**.

6 The common divisors of 12 and 18 are 1, 2, 3 and 6. What is the greatest common divisor of 12 and 18?

Exercise

1 Find all the divisors of 6, 8 and 36 respectively.

2 Write all the common divisors of 8 and 36.

2 Let's think about how to find the common divisors of 18 and 24.
Two friends calculated common divisors in different ways in their exercise books but did not complete.
Complete their ideas by considering their thinking.

Divisors of 18, ①, ②, ③, ⑥, 9, 18
Divisors of 24, ①, ②, ③, 4, ⑥, 8, 12, 24

Divisors of 18　1, 2, 3, 6, 9, 18
24÷1=24, 24÷2=12, 24÷3=8, 24÷6=4,
24÷9=2 r 6, 24÷18=1 r 6

3 Let's find all the common divisors and then find the greatest common divisors.

❶ (8, 16)　❷ (15, 20)　❸ (12, 42)　❹ (13, 9)

There are some pairs of numbers like ❹, that have only 1 as a common divisor.

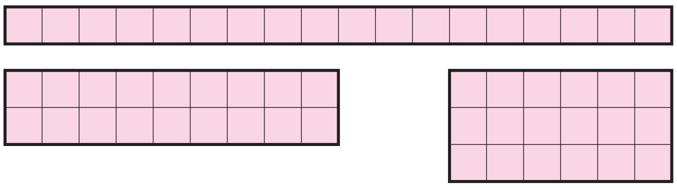
Exercise

1 We want to divide 8 pencils and 12 exercise books equally amongst the students.
What should be the appropriate number of students for distribution?

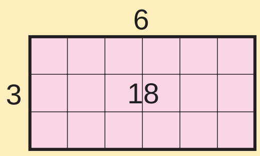
The Relationship between Multiples and Divisors

4 Let’s think about the divisors of 18.

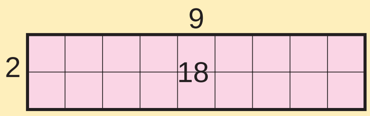
1 Find the divisors of 18 by arranging 18 square cards to make rectangles.



2 Is 18 a multiple of the divisors you found in **1**?



- 3 and 6 are divisors of 18.
- 18 is a multiple of 3 and 6.



- 2 and ☐ are divisors of 18.
- 18 is a multiple of ☐ and 9.

Prime Numbers

Some numbers like 2, 3, 5 and 7 are divisible only by 1 and itself.
Find such numbers amongst the following numbers.
Divide by 2, 3, 4… in order to find them.

2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41

A number that can be divided only by one and itself is called a **prime number**. One is not a prime number.

Using Prime Numbers

5 Let's represent whole numbers by a product form of prime number.

① Express 6 by a product form of a prime number.

② Express 30 by a product form of a prime number.

$$30 = 5 \times 6$$
$$= 5 \times 3 \times 2$$

Let's find divisors of 6.

③ Determine divisors of 30 by using the expression in ②.

2, 3 and 5 are easily found as divisors.

Divisor of 30 is the product of the combination of prime numbers.

6 Let's determine the greatest common divisor of 24 and 36 by using a prime number.

$$24 = 4 \times 6$$
$$= 2 \times 2 \times 2 \times 3$$

$$36 = 6 \times 6$$
$$= 2 \times 3 \times 2 \times 3$$
$$= 2 \times 2 \times 3 \times 3$$

When the multiples representations of prime numbers products are compared, it is common to, $2 \times 2 \times 3 = 12$.

Then, the greatest common divisor is 12.

$$24 = 2 \times 2 \times 2 \times 3$$
$$36 = 2 \times 2 \times 3 \times 3$$

Using multiple representation of prime number products, let's find the numbers that should be multiplied to get the same products?

$24 \times \square = 2 \times 2 \times 2 \times 3 \times \square$

$36 \times \square = 2 \times 2 \times 3 \times 3 \times \square$

7 Let's discuss how to determine the least common multiple of 24 and 36 by using a prime number.

Sieve of Eratosthenes

Determine a prime number that is less than 100 by the next procedure.

① Erase 1.
② Leave 2 and erase multiple of 2.
③ Leave 3 and erase multiple of 3.

Leave the first numbers and erase its multiples.
Using this method, a prime number like 2, 3, 5, 7, 11, etc, are left.

Using this method, find a prime number until 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

How many prime numbers are there?

Sieve of Eratosthenes is a method that was discovered by a mathematician named Eratosthenes in ancient Greece.
He was born in BC (Before Christ) 276 and died BC 194.

3 Even Numbers and Odd Numbers

1 Divide numbers from 0 to 20 into 2 groups by writing them alternately in the two rows below. Start with 0 in the upper row and then 1 in lower row, upper row, lower row, ...sequentially.

0,
1,

① Divide the numbers in each row by 2.

② What did you notice when dividing numbers in each row?

2 Arrange the whole numbers into 2 groups as shown below.

Ⓐ 0, 18, 36…
176, 212…

Ⓑ 1, 19, 37…
177, 213 …

③ In which group does 23 belong? How about 98?

④ What rule did you apply when dividing?

For the whole numbers, the numbers that can be divided by 2 without remainder are called **even numbers** and numbers that can be divided by 2 and leaves a remainder 1 are called **odd numbers**.

3 Identify some situations where we can use even and odd numbers?

Flight No	Time	Departure	Arrival	Time
PX240	08:40	POM	HKN	09:45
PX241	10:15	HKN	POM	11:20
PX110	12:05	POM	MAG	13:05
PX111	13:35	MAG	POM	14:35
PX186	15:20	POM	HGU	16:20
PX187	16:50	HGU	POM	17:50
PX113	07:00	MAG	POM	08:00
PX120	09:00	POM	WWK	10:20
PX121	10:50	WWK	POM	12:10
PX184	12:55	POM	HGU	13:55
PX185	14:25	HGU	POM	15:25

The flight numbers such as PX240 and PX110 that depart from POM are even numbers. The flight numbers such as PX241 and PX111 that arrive in POM are odd numbers.

PX102	09:25	POM	LAE	10:10
PX103	10:40	LAE	POM	11:25
PX204	12:10	POM	RAB	13:35
PX207	14:05	RAB	POM	15:25
PX106	16:10	POM	LAE	16:55
PX107	17:25	LAE	POM	18:10

How about the scores in sports?

EXERCISE

1 Let's think about numbers up to 50. Pages 88 and 98

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

① Make a list of the multiples of 3.

② Make a list of the multiples of 7.

③ Make a list of the common multiples of 3 and 7.

④ Make a list of the divisors of 28.

⑤ Make a list of the divisors of 32.

⑥ Make a list of the common divisors of 28 and 32.

2 Let's write the first 3 common multiples of the following pairs of numbers. Then, find the least common multiples. Pages 92 to 94

① (3, 6) ② (8, 10) ③ (3, 5)

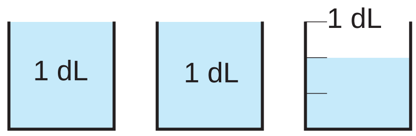
3 Let's find all the common divisors of the following pairs of numbers. Then, find the greatest common divisors. Pages 95 to 98

① (6, 12) ② (18, 20) ③ (32, 42)

Grade 4 Do you remember?

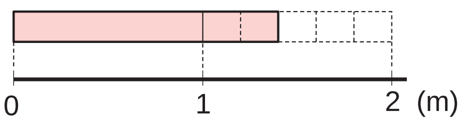
Express the next volume and length by a mixed fraction and an improper fraction.

①



□ $\frac{□}{□}$ dL $\frac{□}{□}$ dL

②



□ $\frac{□}{□}$ m $\frac{□}{□}$ m

PROBLEMS

1 Let's write 3 multiples of the following numbers from the smallest to largest. Find all the divisors for them.

● Finding multiples and divisors.

① 16　② 13　③ 24

2 Let's write 3 common multiples of the following pairs of numbers from the smallest to the largest. Find the least common multiple for them.

● Finding common multiples and least common multiples.

① (3, 7)　② (12, 18)　③ (10, 20)

3 Let's write all the common divisors of the following pairs of numbers.

Find the highest common divisor for them.

● Finding common divisors and the greatest common divisors.

① (9, 15)　② (4, 11)　③ (12, 24)

4 PMV bus A departs every 12 minutes and bus B departs every 8 minutes at 4 mile bus stop. Bus A and B both departed at 9 am. What is the next time that bus A and B will depart at the same time?

● Solving problems by using common multiples or common divisors.

5 Start with a sheet of graph paper that is 30 cm wide and 12 cm long. Cut out squares of the same size so that no paper is left over. How many cm is each side of the biggest square? How many of these squares can be cut out?

● Solving problems by using common multiples or common divisors.

6 Let's find the prime number that is bigger than 50 and closest to 50.

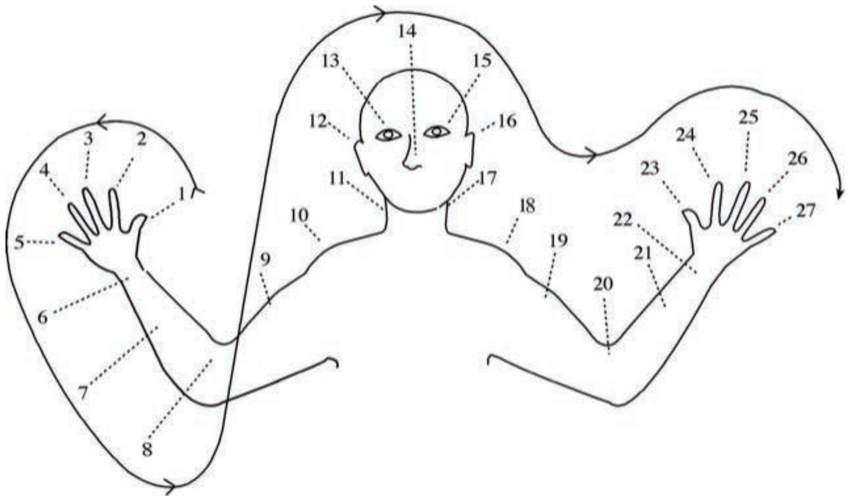
● Understanding some numbers can be divided by only 1 and itself.

Mathematics Practices in Papua New Guinea

Topic 2: Traditional Body Counting System Used in Okasapmin

Papua New Guinea is home to an extraordinary number of languages and cultural groups. Traditionally, these communities have used diverse and fascinating ways to count and communicate about number. Prof. Geoffery Saxe researched the counting system in Oksapmin, Sandaun province. Let's find out the counting system of the Oksapmin people.

Many groups count by pointing to positions on the body and the Oksapmin people are a good example. As shown in the figure, a person begins on the thumb on one side of the body and counts around the upper body to the little finger on the opposite hand while naming corresponding body parts. To count beyond 27, Oksapmin people continue around the body back up the wrist of the second hand.

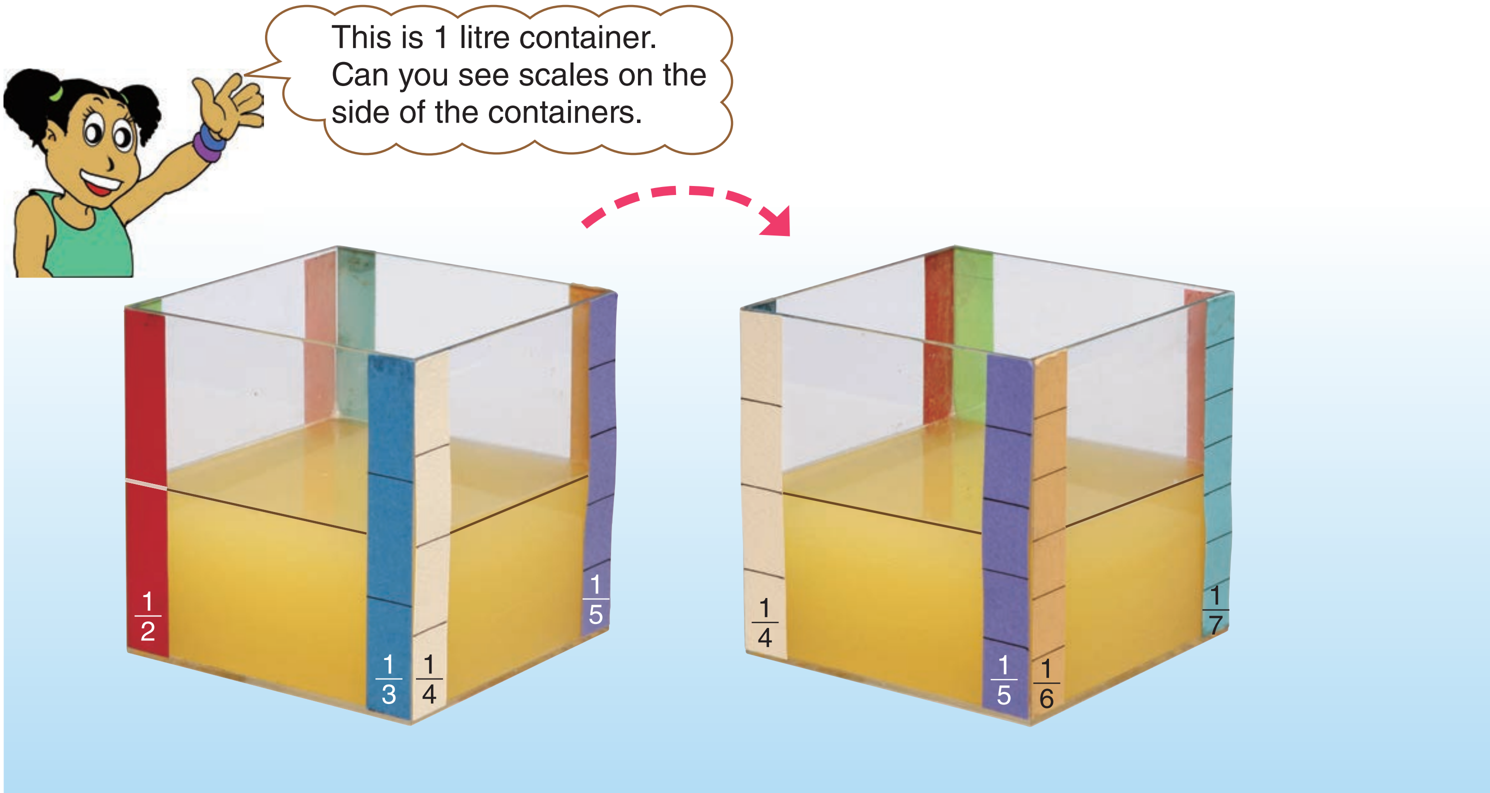


In traditional life, Oksapmin people used their counting system in several ways. For example, they counted important objects; they indicated order, like points of arrival on a path; they tallied contributions in a bride price exchange. You might be surprised to learn that Oksapmin people did not use their body part counting system to solve arithmetic problems in their traditional activities. However, with the introduction of Australian currency (shillings and pounds) in the 1960's and in the shift to Papua New Guinea currency (Kina and toea) with independence from Australia in 1975, Oksapmin people developed new ways of using their body system to calculate money when buying and selling goods.

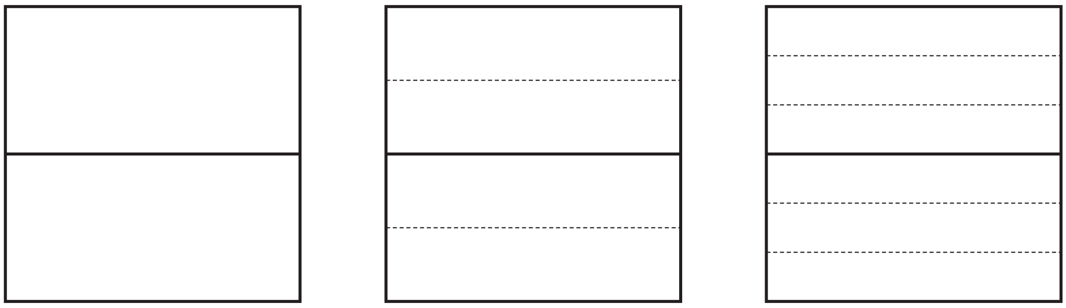
Source: Professor Geoffery Saxe Ph.D., , University of California, Berkeley, 2013.

8 Fractions

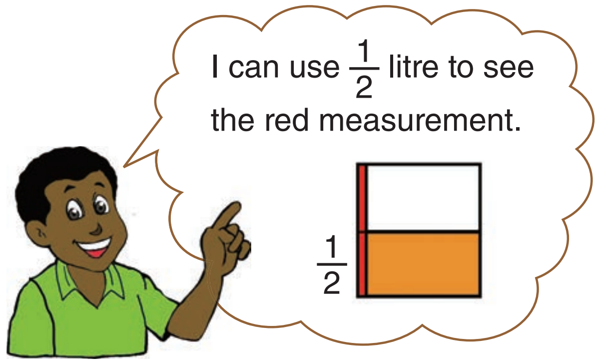
Let's pour some orange juice in a fraction measuring container.

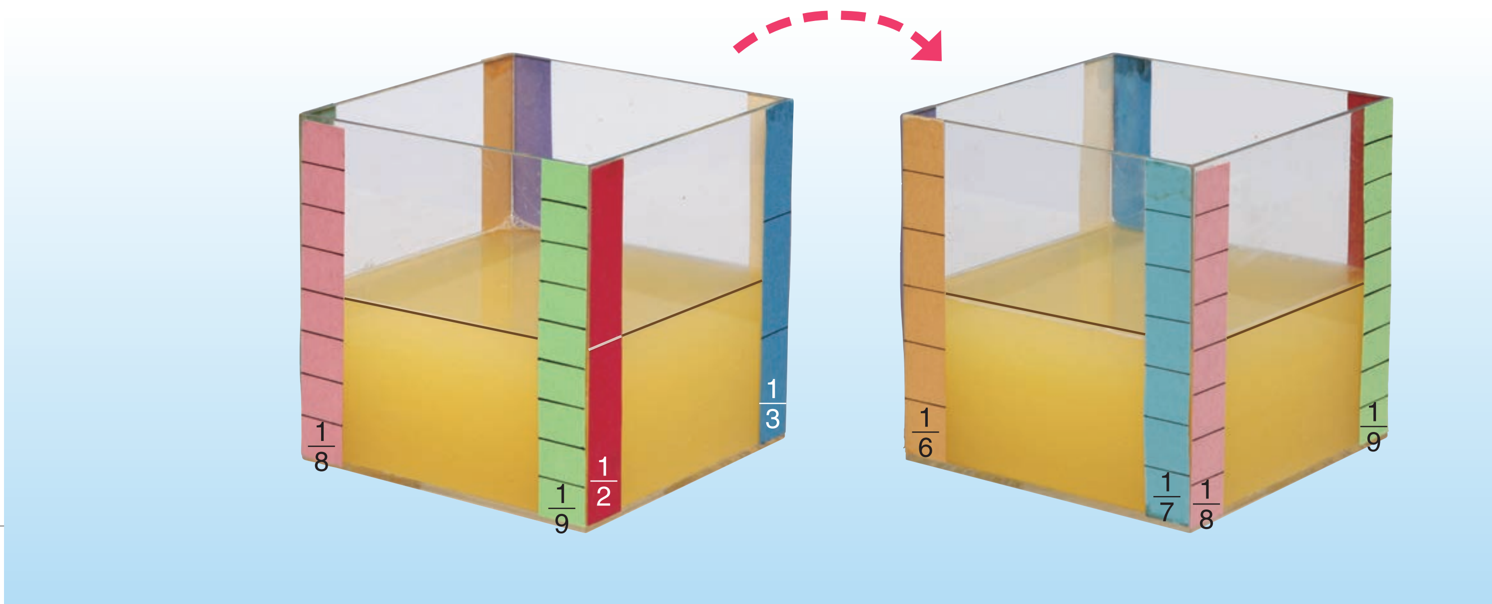


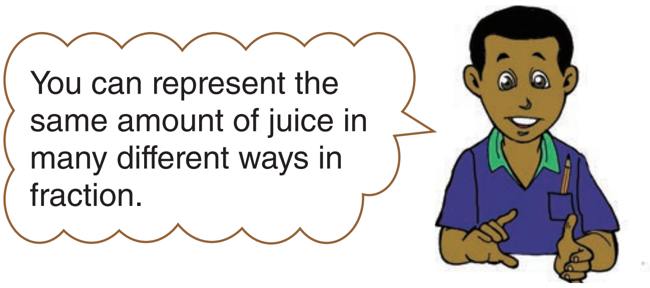
There is $\frac{1}{2}$ L of juice in the fraction measuring container.
If you draw dividing lines as shown below, how will the quantity be represented?
Let's use fractions to represent the quantity of juice.

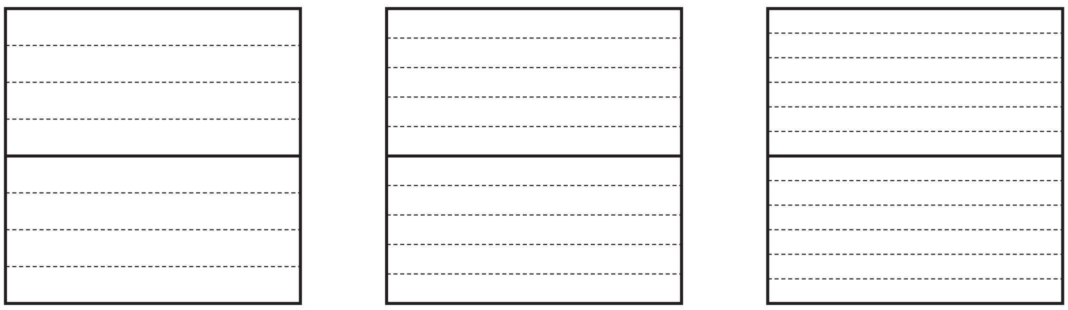


$\frac{\square}{\square}$ L $\frac{\square}{\square}$ L $\frac{\square}{\square}$ L





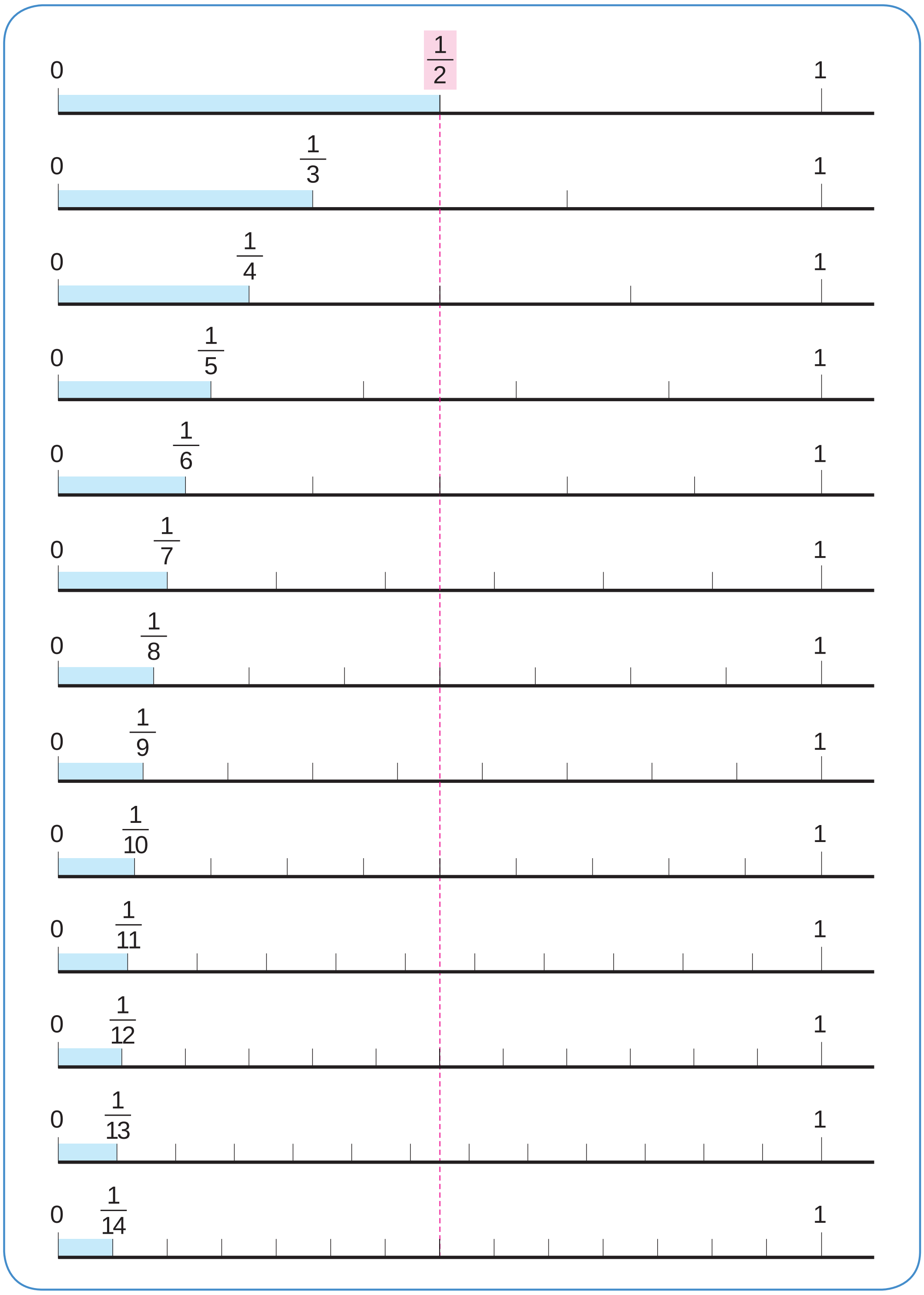




$\frac{\square}{\square}$ L $\qquad$ $\frac{\square}{\square}$ L $\qquad$ $\frac{\square}{\square}$ L

1 Equivalent Fractions

1 Let's explore the equivalence of fractions by using the number line.



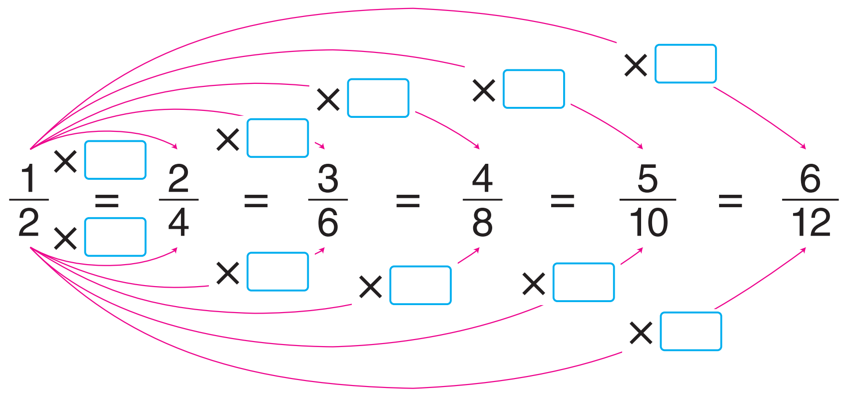
1 Let's find fractions, which are equivalent to $\frac{1}{2}$.

$$\frac{1}{2} = \frac{\square}{4} = \frac{\square}{6} = \frac{\square}{8} = \frac{5}{\square} = \frac{6}{\square} = \frac{\square}{14}$$

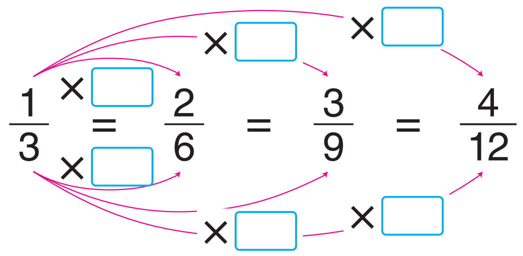
2 Let's find fractions, which are equivalent to $\frac{1}{3}$.

$$\frac{1}{3} = \frac{\square}{6} = \frac{3}{\square} = \frac{\square}{12}$$

3 What numbers are multiplied to each denominator and numerator of the fraction $\frac{1}{2}$ in problem **1**?

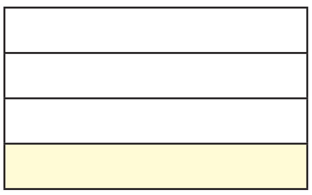


4 What numbers are multiplied to each denominator and numerator of the fraction $\frac{1}{3}$ in problem **2**?



Exercise

Let's develop 4 fractions which are equivalent to $\frac{1}{2}$.



2 Comparision of Fractions

Let's compare the sizes of $\frac{2}{4}$, $\frac{2}{3}$ and $\frac{3}{4}$.

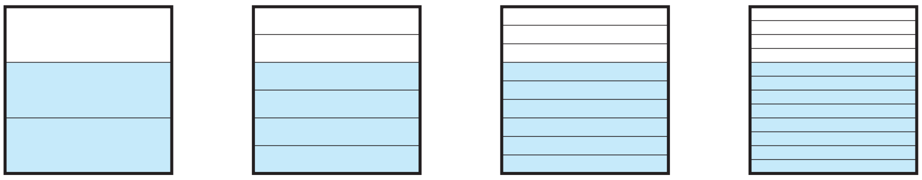
$\frac{2}{4}$ and $\frac{3}{4}$ have same denominator so we can compare them.

How can we compare the sizes of $\frac{2}{3}$ and $\frac{3}{4}$.

Let's think about how to compare the size of fractions with different denominators.

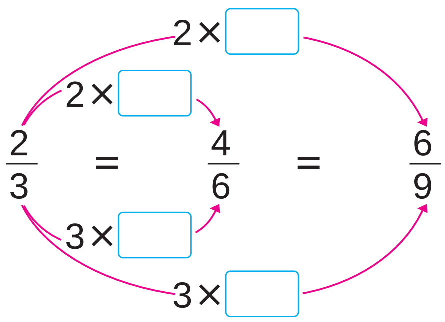
1 Let's think about how to compare $\frac{2}{3}$ and $\frac{3}{4}$.

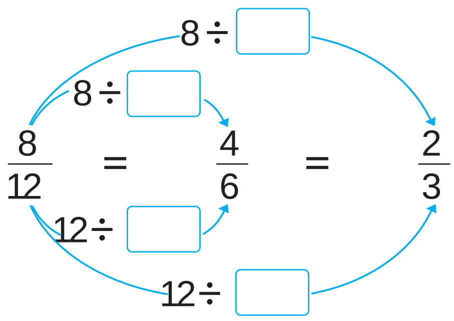
① Let's represent $\frac{2}{3}$ using various fractions.



Ⓐ Let's represent $\frac{2}{3}$ by $\frac{1}{6}$, $\frac{1}{9}$ and $\frac{1}{12}$ as the units.

Ⓑ What is the relationship between denominators and numerators of equivalent fractions?





The size of fractions does not change even if the numerator and denominator are multiplied or divided by the same number.

$$\frac{\blacktriangle}{\bullet} = \frac{\blacktriangle \times \blacksquare}{\bullet \times \blacksquare} = \frac{\blacktriangle \div \blacksquare}{\bullet \div \blacksquare}$$

2 Let's represent $\frac{3}{4}$ by $\frac{1}{8}$, $\frac{1}{12}$ and $\frac{1}{16}$ as the units.

$$\frac{3}{4}=\frac{3\times\square}{4\times\square}=\frac{\square}{12}$$

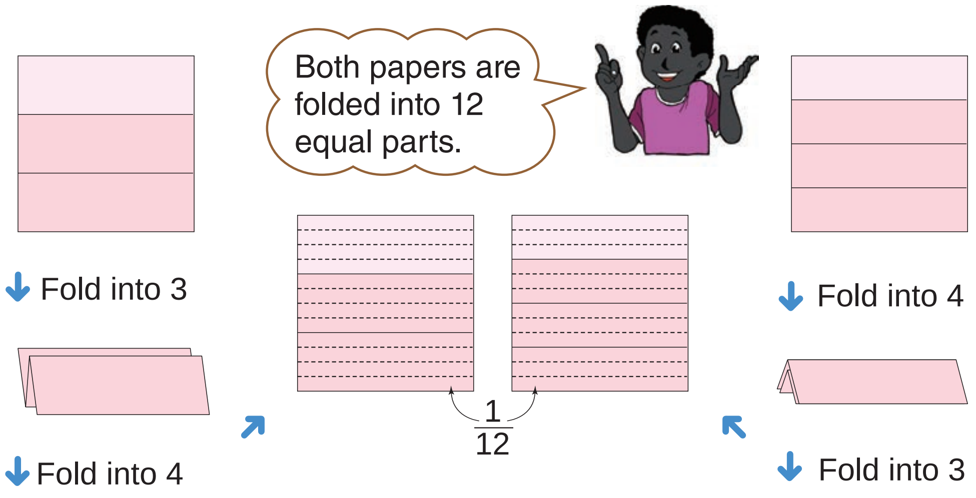
The same fraction can be represented in many ways by changing the units.

3 Let's compare $\frac{2}{3}$ and $\frac{3}{4}$ by changing their representation using the same denominator.

$\frac{2}{3}=\square$, $\frac{3}{4}=\square$ therefore, $\frac{2}{3}\ \square\ \frac{3}{4}$

Let's Fold a Paper to Compare the Size of Fractions

Let's fold square papers to represent $\frac{2}{3}$ and $\frac{3}{4}$ as fractions with the same denominator.



$\frac{2}{3}=\square$ $\frac{3}{4}=\square$

Common Denominators

2 Compare $\frac{3}{4}$ and $\frac{4}{5}$ by changing them to equivalent fractions with a common denominator. Which denominators can the two fractions below be compared with? Circle them.

$\frac{3}{4}$ | $\frac{6}{8}$ $\frac{9}{12}$ $\frac{12}{16}$ $\frac{15}{20}$ $\frac{18}{24}$ $\frac{21}{28}$ $\frac{24}{32}$ $\frac{27}{36}$ $\frac{30}{40}$ ....

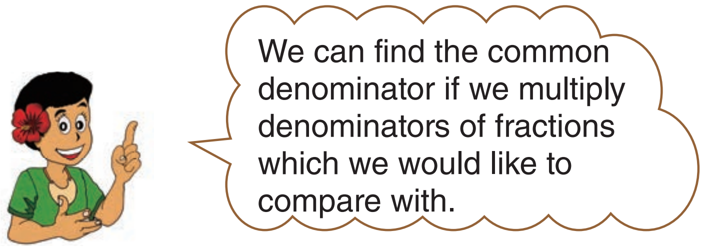
$\frac{4}{5}$ | $\frac{8}{10}$ $\frac{12}{15}$ $\frac{16}{20}$ $\frac{20}{25}$ $\frac{24}{30}$ $\frac{28}{35}$ $\frac{32}{40}$ $\frac{36}{45}$ $\frac{40}{50}$ ....

Fractions with different denominators can be compared by changing them to fractions with the same denominator.

Finding a common denominator means changing fractions with different denominators into equivalent fractions with the same denominator.

3 Compare $\frac{2}{3}$ and $\frac{4}{7}$ by changing them into fractions with common denominators.

$\frac{2}{3} = \frac{\square}{21}$, $\frac{4}{7} = \frac{\square}{21}$, then $\frac{2}{3} \square \frac{4}{7}$



Finding Common Denominators

4 Let's find the common denominator for $\frac{5}{6}$ and $\frac{7}{8}$.

Mero's Idea

Multiply the two denominators to get the common denominator.

$$\frac{5}{6} = \frac{5\times\square}{6\times\square} = \frac{40}{48}$$

$$\frac{7}{8} = \frac{7\times\square}{8\times\square} = \frac{42}{48}$$

Yamo's Idea

Choose 24, the least common multiple of 6 and 8, as the common denominator.

$$\frac{5}{6} = \frac{5\times\square}{6\times\square} = \frac{20}{24}$$

$$\frac{7}{8} = \frac{7\times\square}{8\times\square} = \frac{21}{24}$$

5 Usually, you should choose the least common multiple as the common denominator to use as the smallest common denominator.

Let's compare the following fractions using common denominators.

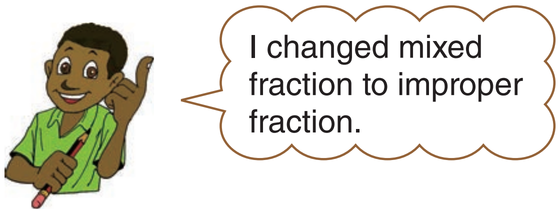
① $\frac{1}{4}$ and $\frac{2}{7}$ The least common multiple of 4 and 7 is $\square$.

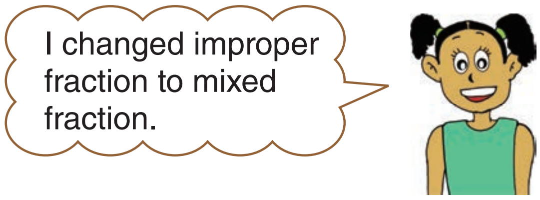
$$\frac{1}{4} = \frac{1\times\square}{4\times\square} = \frac{\square}{\square},\ \frac{2}{7} = \frac{2\times\square}{7\times\square} = \frac{\square}{\square}, \text{ therefore } \frac{1}{4}\ \square\ \frac{2}{7}$$

② $\frac{1}{3}$ and $\frac{2}{9}$ The least common multiple of 3 and 9 is $\square$.

$$\frac{1}{3} = \frac{1\times\square}{3\times\square} = \frac{\square}{\square}, \text{ therefore } \frac{1}{3}\ \square\ \frac{2}{9}$$

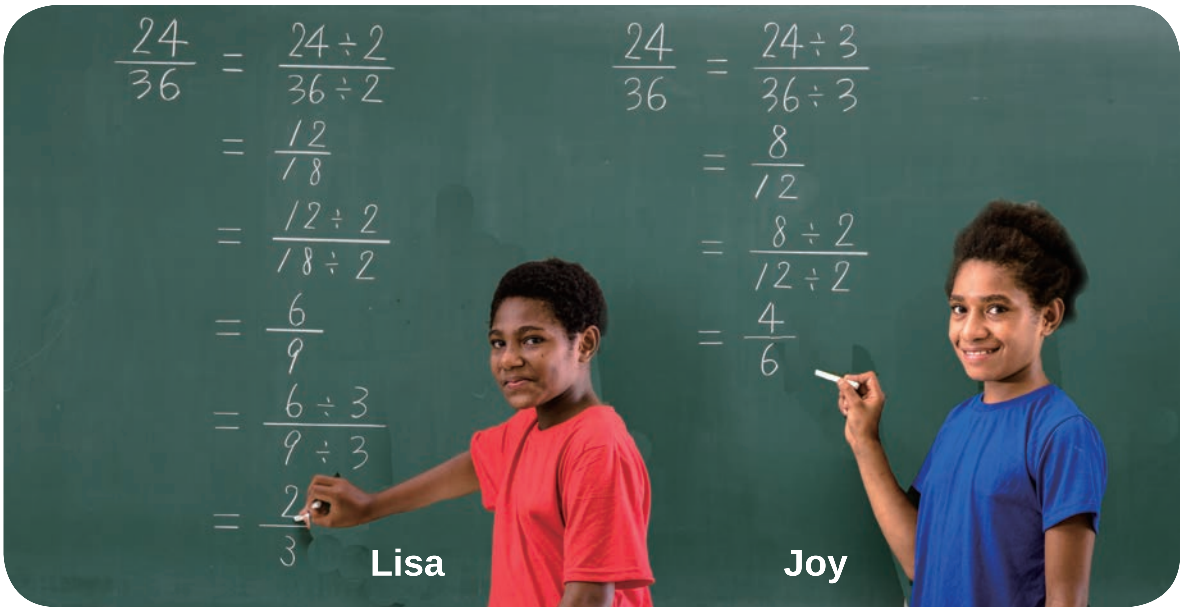
6 Let's compare $1\frac{3}{4}$ and $\frac{11}{6}$ using a common denominator.





Reducing Fractions

7 Lisa and Joy are looking for fractions that are equivalent to $\frac{24}{36}$ and with denominators and numerators smaller than 36 and 24.



1. What rule of fraction are they using?
2. Lisa and Joy got different fractions. Explain their reasons.

Phrase

Because

It is a word used to explain, by stating the conclusion first and then explaining why by showing a reason.

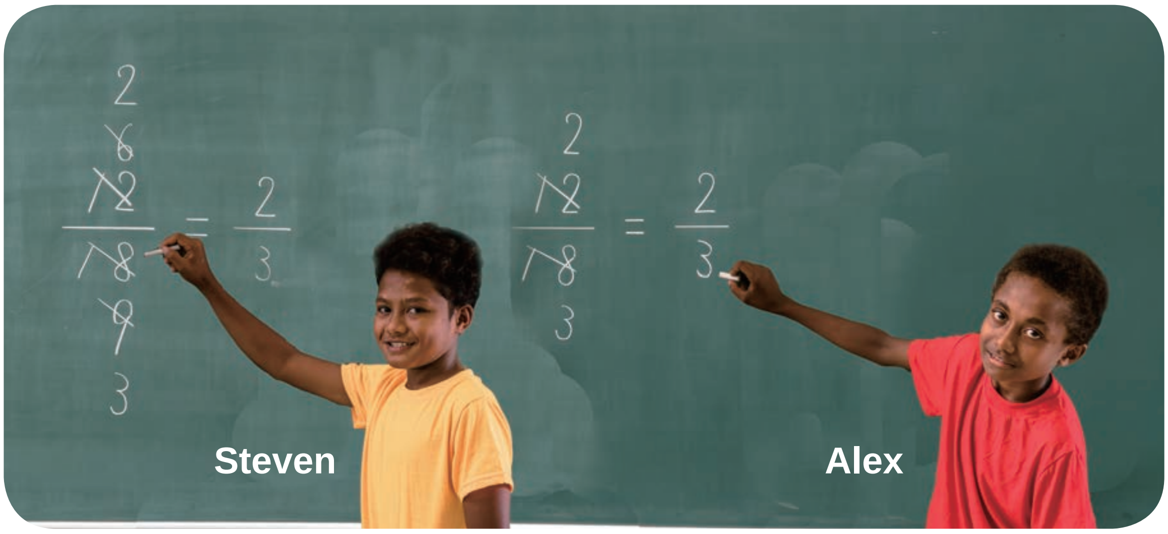
" ◯◯◯ is because △△△ ".

For example: We reduce fractions **because** it makes calculation easier.

Reducing a fraction means dividing the numerator and denominator by a common divisor to make a simpler fraction.

When we reduce a fraction, we usually divide until we get the smallest numerator and denominator.

8 Steven and Alex reduced $\frac{12}{18}$. Let's explain their ideas.



1. What are the similarities in their ideas?
2. What are the differences between their ideas?

When you reduce a fraction, use the greatest common divisor to reduce the denominator and numerator, just like Alex did in **8**.

Exercise

1 Let's reduce these fractions to a common denominator and fill in the ☐ with inequality signs.

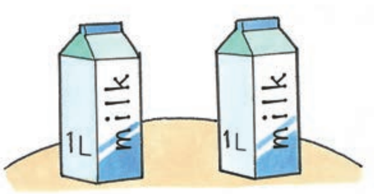
① $\frac{2}{3}$ ☐ $\frac{4}{5}$ ② $\frac{1}{2}$ ☐ $\frac{3}{8}$ ③ $\frac{5}{6}$ ☐ $\frac{8}{9}$ ④ $\frac{7}{12}$ ☐ $\frac{5}{8}$

2 Let's reduce these fractions.

① $\frac{8}{10}$ ② $\frac{3}{21}$ ③ $\frac{16}{20}$ ④ $\frac{18}{24}$

1 Fractions, Decimals and Whole Numbers

Quotients and Fractions



1 When we divide 2 L milk amongst ☐ students equally, how many litres of milk will each student receive?

2 ÷ ☐

① Enter the numbers from 1 to 5 in the ☐ and calculate the answers.

2 ÷ ☐, 2 ÷ ☐, 2 ÷ ☐, 2 ÷ ☐, 2 ÷ ☐

② Divide the above expressions into 3 groups based on the answers.

Ⓐ Answers that are whole numbers.

( )

Ⓑ Answers that are expressed exactly as decimal numbers.

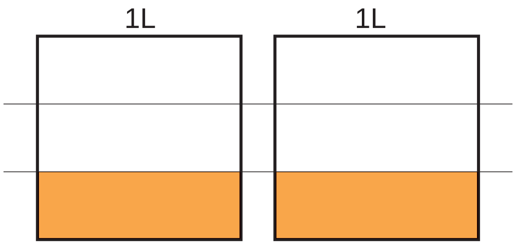
( )

Ⓒ Answers that are not expressed exactly as decimal numbers.

( )

2 ÷ 3 is 0.666..., so this cannot be expressed exactly as a decimal number because there is no end.

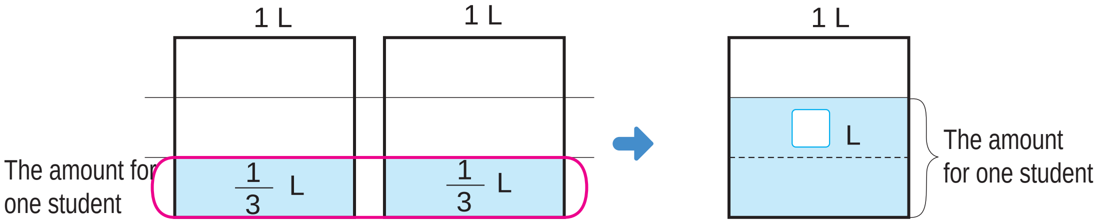
③ When 2 L is divided equally amongst 3 students.



Ⓐ Colour the part for one student in the diagram.

Ⓑ How many L will each student receive?

Let's see how to express the quotient of a division problem when it cannot be expressed exactly as a decimal number.



The amount for one student when 1 L is divided into 3 equal parts… □ L.

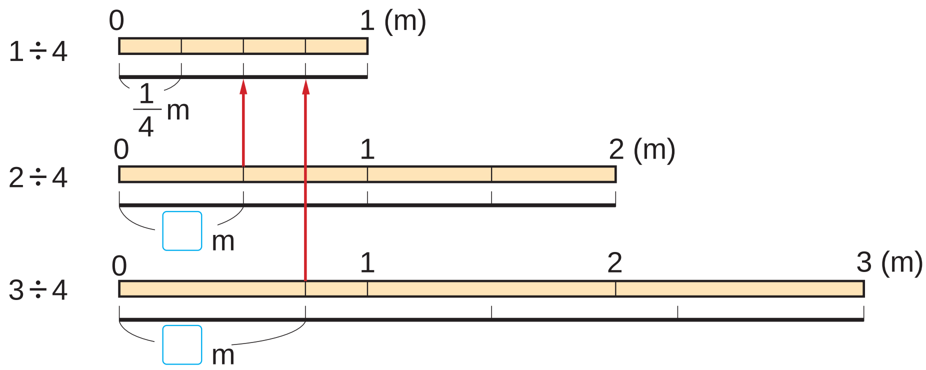
The amount for one student when 2 L is divided into 3 equal parts… □ L.

I used $\frac{1}{3}$ L from the first 1 L container and $\frac{1}{3}$ L from the second 1 L container to fill up the empty container.

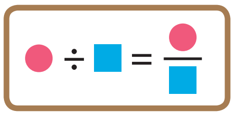
$$2 \div 3 = \frac{\square}{\square}$$

2 Let's find the length of one section when 1 m, 2 m and 3 m string is divided into 4 equal parts?

1. Let's write mathematical expressions for 1 m, 2 m and 3 m strings.
2. Let's find the answers based on a 1 m string?



The quotient of a division problem in which a whole number is divided by another whole number can be expressed as a fraction.



The quotient can be expressed precisely as a fraction.

Exercise

Let's represent the quotient using a fraction.

① 1÷6 ② 5÷8 ③ 4÷3 ④ 9÷7

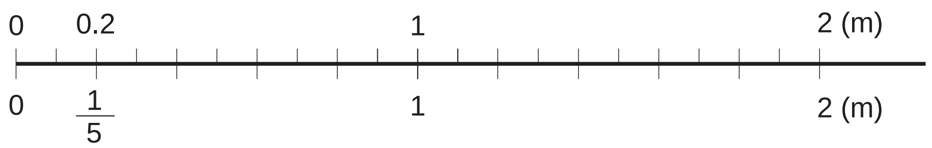
Fractions, Decimals and Whole Numbers

3 If we divide a 2 m tape into 5 equal sections, how many metres long will be each section?

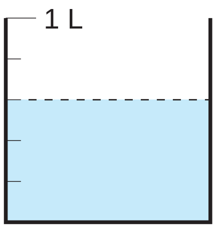
① Let's express the answer as a fraction and as a decimal number.

$2 \div 5 = \frac{\square}{\square}$ $\qquad$ $2 \div 5 = \square$

② Let's write this fraction and decimal number on the number line.

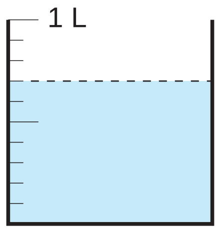


4 Which is larger $\frac{3}{5}$ L or 0.7 L?



$\frac{3}{5} = 3 \div 5 = \square$ therefore,

$\frac{3}{5} \square 0.7$



To represent a fraction as a decimal number or whole number, we divide the numerator by the denominator.

5 Let's express these fractions as decimal numbers or whole numbers.

① $\frac{3}{10} = \square$

② $\frac{29}{100} = \square$

③ $\frac{12}{4} = 12 \div 4 = \square$

④ $1\frac{3}{5} = \frac{8}{5} = 8 \div 5 = \square$

6 Let's express 2 and 5 as fractions.

$2 = 2 \div 1 = \frac{2}{1}$ $\quad$ $5 = 5 \div 1 = \square$

$2 = 4 \div 2 = \frac{4}{2}$ $\quad$ $5 = 10 \div 2 = \square$

$2 = 8 \div \square = \square$ $\quad$ $5 = 30 \div \square = \square$

Whole numbers can be expressed as fractions no matter what number you choose for the denominator.

7 Let's express the decimal numbers 0.19 and 1.7 as fractions.

① Since 0.19 is 19 sets of 0.01,

↓

we can think of this as 19 sets of $\frac{1}{100}$ and get □.

② Since 1.7 is □ sets of 0.1,

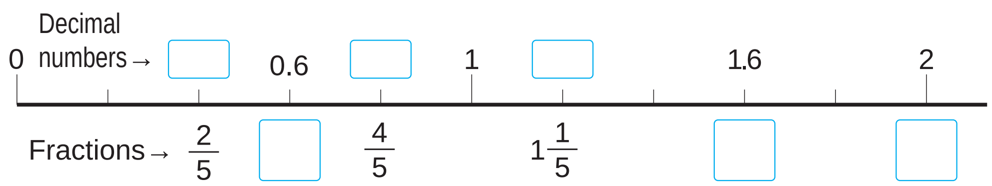
↓

we can think of this as 17 sets of □ and get □.

Decimal numbers can be expressed as fractions if we choose $\frac{1}{10}$ and $\frac{1}{100}$ as the units.

Exercise

Fill in the □ with decimals and fractions.



8 Let's divide the following fractions into 3 groups.

$\frac{8}{10}$ $1\frac{1}{2}$ $\frac{4}{11}$ $\frac{3}{5}$ $\frac{3}{1}$ $2\frac{1}{3}$ $\frac{6}{3}$

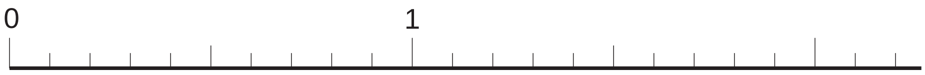
Ⓐ Whole numbers. ☐

Ⓑ Accurate decimal numbers. ☐

Ⓒ Other decimal numbers. ☐

9 Let's place these numbers on the number line below.

$\frac{4}{11}$ $\frac{4}{5}$ 0.6 $1\frac{7}{20}$ 2 1.25 $\frac{1}{4}$ $\frac{2}{3}$



Whole numbers, decimal numbers and fractions can all be expressed on one number line.
That makes it easy to compare numbers.

Changing fractions to decimal numbers makes them easier to compare.

$\frac{2}{3}=2\div3=0.666...$about 0.67

Exercise

1 Let's line up these numbers starting from the smallest.

1.3 0.75 $\frac{4}{2}$ $1\frac{1}{2}$ $\frac{7}{10}$ $\frac{5}{7}$

2 Let's change decimals to fractions and fractions to decimals or whole numbers.

① 0.9 ② 1.25 ③ $\frac{3}{4}$ ④ $\frac{24}{6}$ ⑤ $1\frac{2}{5}$

EXERCISE

1 Let's change fractions using common denominators by filling in the □ with inequality signs.

Pages 110 to 111, 115

① $\frac{2}{3}$ □ $\frac{1}{2}$ ② $\frac{3}{4}$ □ $\frac{5}{7}$ ③ $\frac{1}{6}$ □ $\frac{5}{18}$ ④ $\frac{6}{3}$ □ $\frac{5}{12}$

2 Let's reduce these fractions.

Pages 114 to 115

① $\frac{4}{8}$ ② $\frac{6}{9}$ ③ $\frac{21}{28}$ ④ $\frac{16}{24}$ ⑤ $\frac{75}{100}$

3 Let's represent their quotients by fractions.

Pages 116 to 117

① $1 \div 7$ ② $5 \div 9$ ③ $11 \div 3$

4 Let's represent these fractions by decimals or whole numbers.

Pages 118 to 120

① $\frac{5}{10}$ ② $\frac{31}{100}$ ③ $\frac{18}{6}$ ④ $1\frac{1}{4}$

5 Let's represent these decimals with fractions.

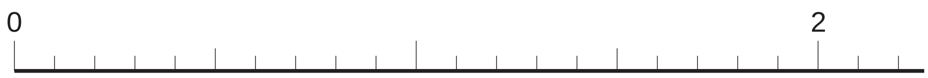
Pages 119 to 120

① 0.3 ② 1.9 ③ 0.61 ④ 1.11

6 Let's write ↓ for numbers on the number line.

Pages 118 to 120

1 $\frac{2}{5}$ 0.7 $1\frac{5}{20}$ 1.8 $\frac{7}{5}$



Grade 4 Do you remember?

Let's calculate.

① $\frac{1}{5} + \frac{1}{5}$ ② $\frac{2}{7} + \frac{5}{7}$ ③ $1\frac{2}{4} + \frac{3}{4}$

④ $1\frac{5}{7} - \frac{6}{7}$ ⑤ $2\frac{3}{5} - 1\frac{4}{5}$ ⑥ $2 - \frac{5}{8}$