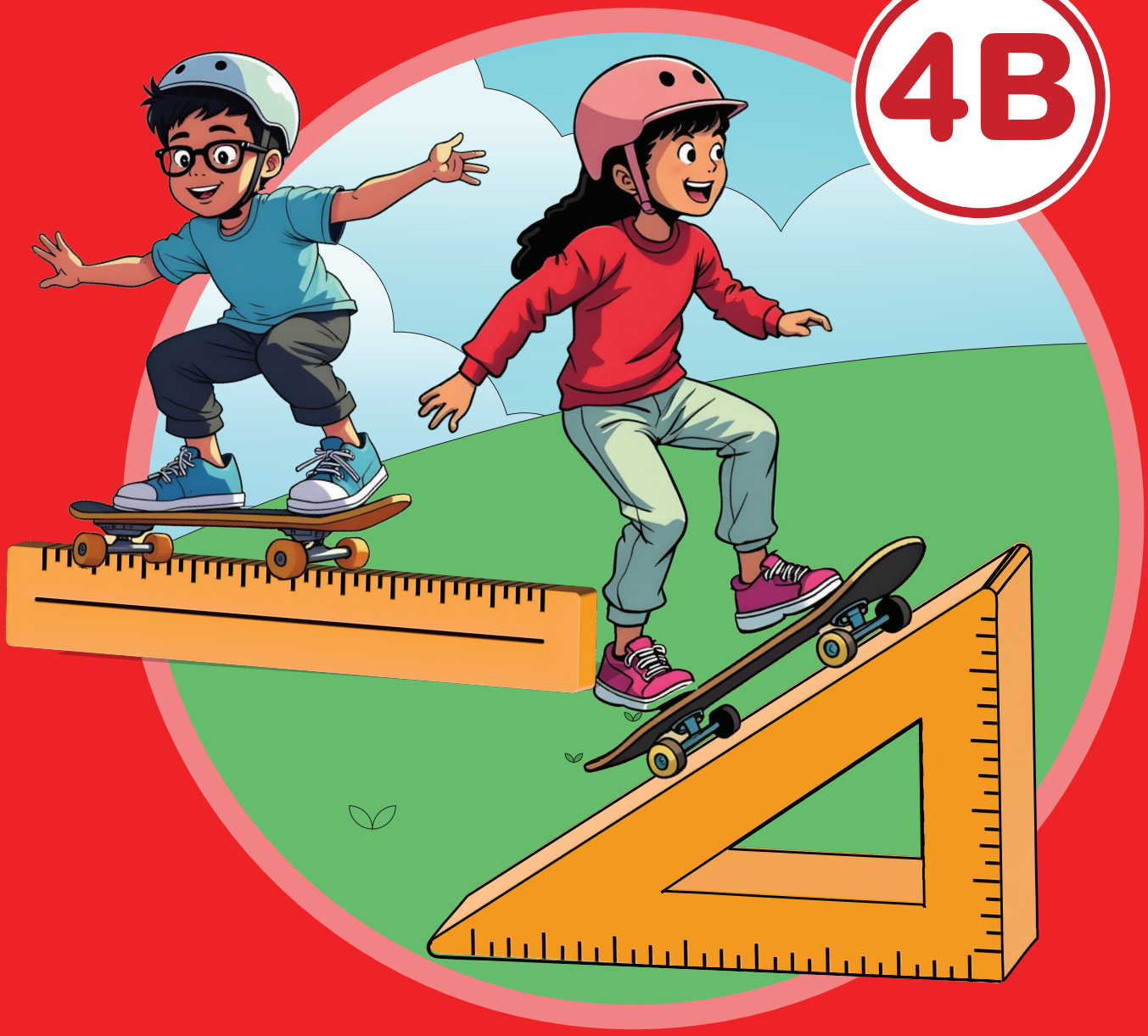
Exploring Mathematics

4B



NATIONAL INSTITUTE OF EDUCATION

Exploring

Mathematics

4B

Grade 4

This book belongs to

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NATIONAL INSTITUTE OF EDUCATION

Exploring Mathematics 4B

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Preface

Exploring Mathematics 4 aims to extend the knowledge, skills and theory of mathematics offered in the books beyond the classrooms to real-life situations where problems are solved, and meanings applied.

The topics covered throughout the series closely follow the concepts of the National Curriculum, progressing from simple to complex, covering the five mathematical strands and providing a holistic perspective of the discipline. In addition, the acquisition of mathematical competence is considered vital for improved problem solving, logical reasoning, creative and critical thinking skills to take place.

In this approach, the book constantly attempts to unburden mathematics from their classically derived conceptual explanations. As such, numbers, shapes, measures, patterns, datasets, etc., are contextualised realistically in the students' immediate environments. In the process, mathematics, that was once considered abstract, discrete and remote, is reimagined as concrete and physical, permeating and invigorating everyday human pursuits.

Exploring Mathematics 4 is published exclusively by National Institute of Education.

Integrating Key Competencies into Everyday Learning

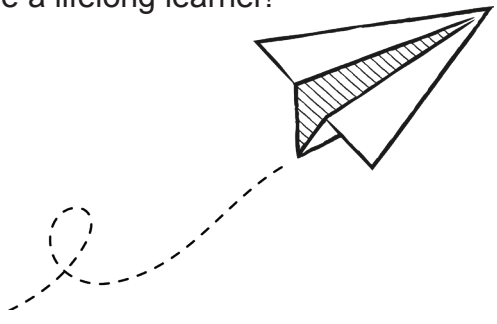
Key competencies are essential life skills that help you navigate different situations and learning experiences as a student. These skills are not just for school—they prepare you to think critically, solve problems, communicate effectively, and work well with others in all aspects of life.

As you learn new subjects, you are also developing key competencies. These skills are part of everything you do in school and beyond. Your teachers will help you understand how these competencies connect to real-life situations and why they are important. They will also guide you in recognizing your strengths and finding ways to improve.

Throughout your learning journey, you will have many opportunities to practice and strengthen these eight key competencies. Engaging in creative, collaborative, and hands-on activities will help you apply them in different ways. Learning is not just about what you study but also about how you grow and adapt.

Working with others is an important part of developing these skills. Activities that involve teamwork and problem-solving will help you build confidence, both as an individual and as a team player. The more you practice these competencies, the more prepared you will be for the future.

These skills are useful everywhere—at school, at home, and in your community. By actively using and improving them, you are preparing yourself for success in learning, relationships, and life. Take every opportunity to challenge yourself, think creatively, and become a lifelong learner!



The Key Competencies

Practicing Islam

Understanding & Managing Self

Living a Healthy Life

Relating to People

Thinking Critically & Creatively

Making Meaning

Using Technology & the Media

Using Sustainable Practices

CONTENTS

Unit 7

FRACTIONS

I will learn to:

- Find the families of common equivalent fractions.
- Compare fractions.
- Add and subtract fractions with common denominators.

Math mindset

- I use different tools to visualize Math problems to clarify complex ideas and make them more manageable.
- I use models, numbers, and lines to represent my thinking.
- This method encourages creative thinking and can lead to innovative solutions.

Warm up

Math in Real Life

We use fractions daily.

For example,

- Fractions are used in baking to tell how much of an ingredient to use,
- Fractions are used in telling time,
- Fractions are used to determine discounts in shops.

Discuss and come up with 3 other situations where we use fractions in daily life.

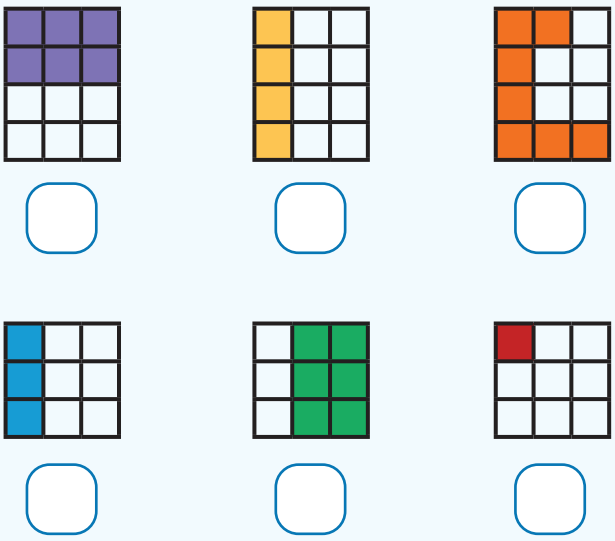
Let's recall

Let's recall what we have learned in grade 3.

1 A cake is divided into 8 equal slices. If a single slice is eaten, how can we represent the remaining portion of the cake?

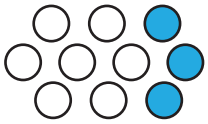
Remaining portion of the cake is:.....

2 Look at the 6 fractions. Tick the pair of fractions that make a whole.



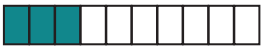
Different ways to represent fractions $\frac{3}{10}$

Parts of a Group



Number Line

Fraction Bar



Fraction Circle

3 Plot $\frac{5}{6}$ on the number line.

4 Which number line shows $\frac{2}{5}$?

a)

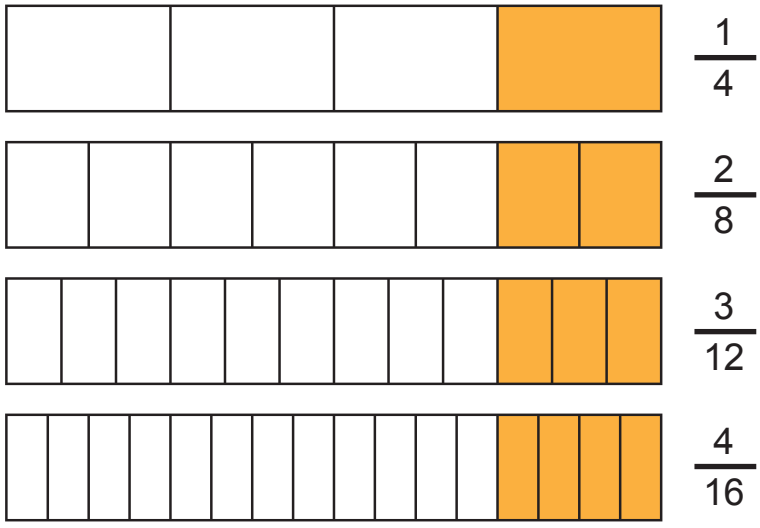
b)

c)

Equivalent fractions using models

Sameer and Ayyoob are finding equivalent fractions of $\frac{1}{4}$.
Sameer used models while Ayyoob used his multiplication skills.

Sameer's method



Ayyoob's method

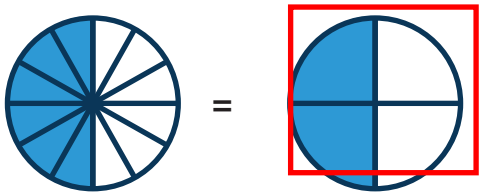
$$\frac{1}{4} \begin{matrix}\times 2 \\ \times 2\end{matrix} = \frac{2}{8}$$

$$\frac{1}{4} \begin{matrix}\times 3 \\ \times 3\end{matrix} = \frac{3}{12}$$

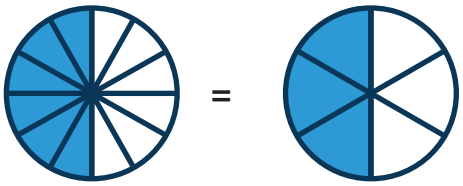
$$\frac{1}{4} \begin{matrix}\times 4 \\ \times 4\end{matrix} = \frac{4}{16}$$

Hawwa used her division skills to find the equivalent fractions.

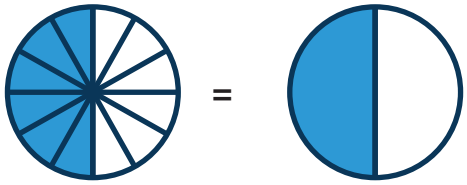
a) $\frac{6}{12} = \frac{\div 3}{\div 3} = \frac{2}{4}$

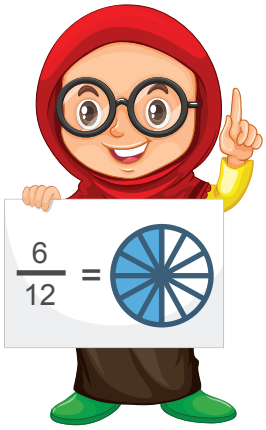


b) $\frac{6}{12} = \frac{\div 2}{\div 2} = \frac{3}{6}$



c) $\frac{6}{12} = \frac{\div 6}{\div 6} = \frac{1}{2}$





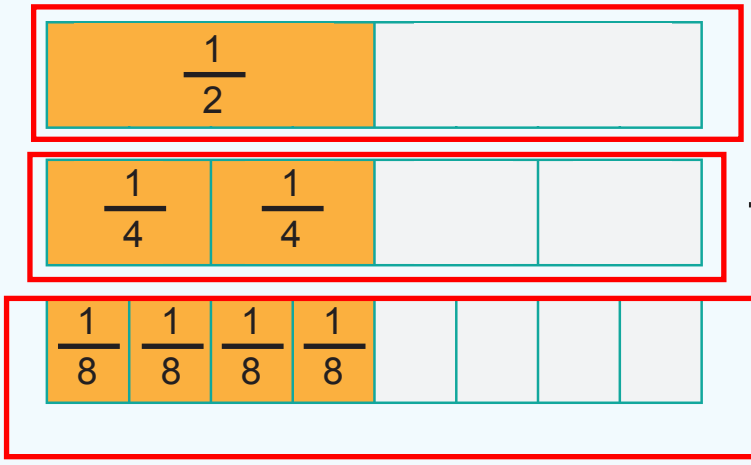
Let's investigate

Explore the families of equivalent fractions using paper stripes.
For example, show that $\frac{2}{4}$ is equivalent to $\frac{1}{2}$ by folding both strips in half.

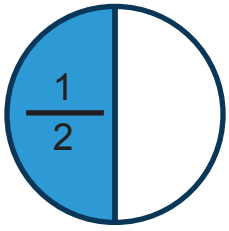
Find families of:

- Fractions equivalent to $\frac{1}{3}$:
- Fractions equivalent to $\frac{2}{3}$:
- Fractions equivalent to $\frac{1}{4}$:

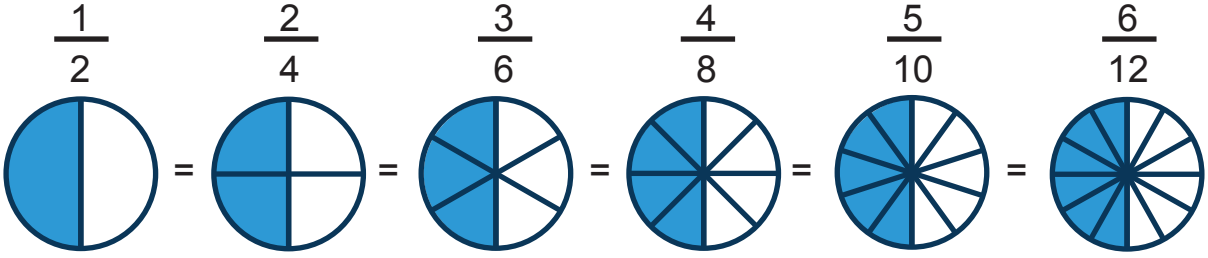
Example: Fractions equivalent to $\frac{1}{2}$.



$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$

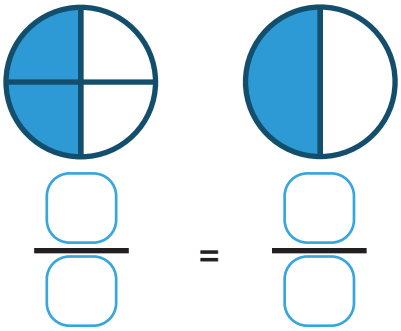


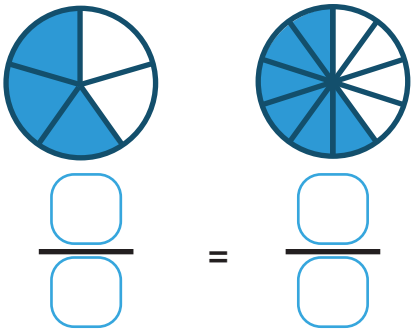
is equal to...

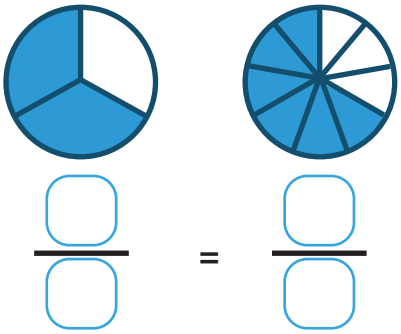


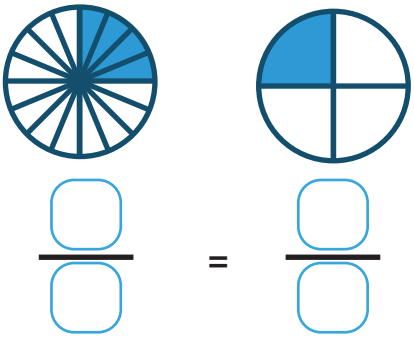
Exercise 1

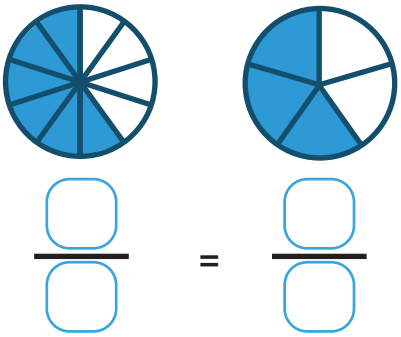
1 Use the diagrams to find equivalent fractions.

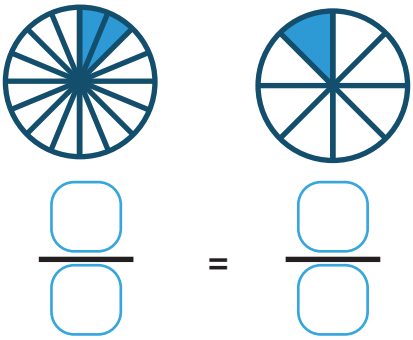
a)  $\frac{\square}{\square} = \frac{\square}{\square}$

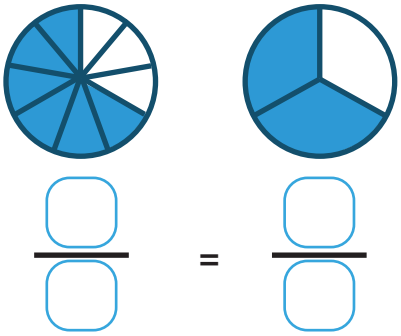
b)  $\frac{\square}{\square} = \frac{\square}{\square}$

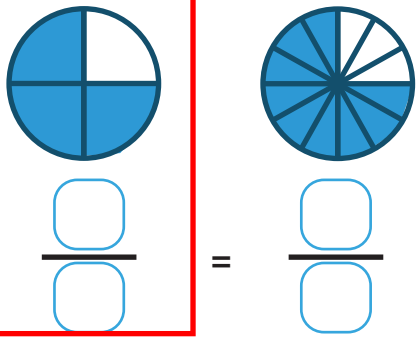
c)  $\frac{\square}{\square} = \frac{\square}{\square}$

d)  $\frac{\square}{\square} = \frac{\square}{\square}$

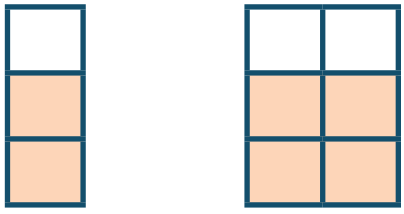
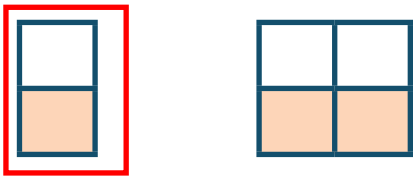
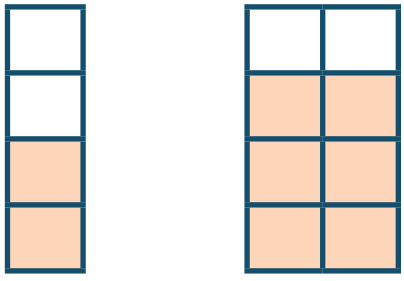
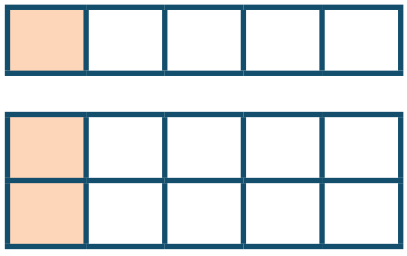
e)  $\frac{\square}{\square} = \frac{\square}{\square}$

f)  $\frac{\square}{\square} = \frac{\square}{\square}$

g)  $\frac{\square}{\square} = \frac{\square}{\square}$

h)  $\frac{\square}{\square} = \frac{\square}{\square}$

2 Use the diagrams to find equivalent fractions and fill in the blanks.

Pictorial representations	Fraction	Words
	$\frac{2}{3} = \frac{4}{6}$	Two thirds is equivalent to four sixths.
	$\frac{\square}{\square} = \frac{\square}{\square}$	..... is equivalent to .....
	$\frac{\square}{\square} = \frac{\square}{\square}$	..... is equivalent to .....
	$\frac{\square}{\square} = \frac{\square}{\square}$	..... is equivalent to .....

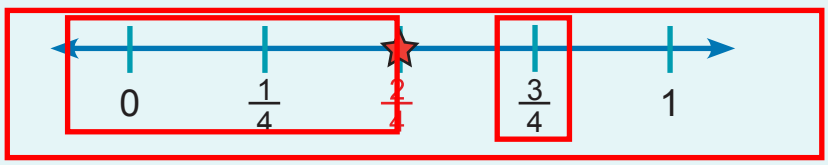
Equivalent fractions on a number line

Hana likes to use number lines to visualize fractions.
To represent equivalent fractions on the number line, she subdivided each part equally.
Then she counted the total number of parts and the position of the marked point.
At last, she put the position of marked point at numerator and total number of parts in the denominator.

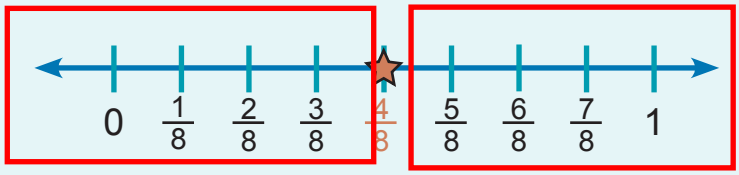
For example, she represented equivalent fraction of $\frac{1}{2}$ as,

STEP 1: Draw a number line through 0 and 1.
STEP 2: Then, divide the whole into two parts as equal to the denominator.
STEP 3: Mark $\frac{1}{2}$ on the line.
STEP 4: Subdivide each part into two equal parts.
STEP 5: Then we can see for the same position of the new fraction is $\frac{2}{4}$, because there are 4 equal parts and the marking is after two equal parts.

So, $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions.



Again, by subdividing into equal parts we can show, $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$ and so on are equivalent fractions.



Share your thinking

a) Analyse the difference between Sameer, Ayyoob, Hawwa and Hana's method of finding equivalent fractions. Discuss the methods and share your thinking.

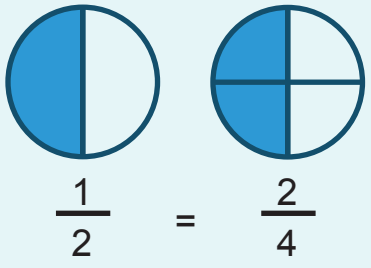
b) Hawwa says, "to find equivalent fractions, whatever you do to the numerator you do to the denominator".

Is it true? Use the above examples to justify your answer.

Exercise 2

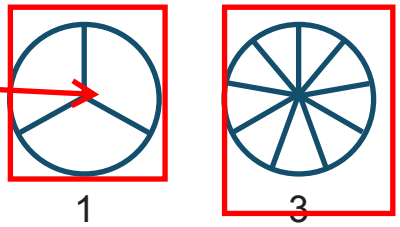
1 Shade and represent that two fractions are equivalent.

a)



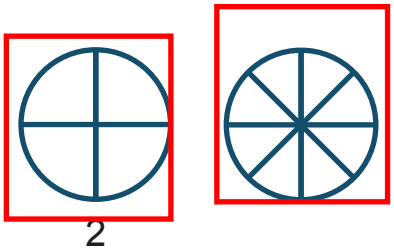
$\frac{1}{2} = \frac{2}{4}$

b)



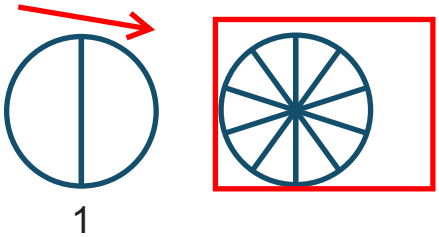
$\frac{1}{3} = \frac{3}{9}$

c)



$\frac{2}{4} = \frac{\quad}{8}$

d)



$\frac{1}{2} = \frac{\quad}{10}$

2 Fraction equivalence using multiplication.

a) $\frac{1}{2} = \frac{\square}{\square}$ (× 5 / × 5)

b) $\frac{3}{4} = \frac{\square}{16}$ (× □ / × □)

c) $\frac{3}{8} = \frac{\square}{48}$ (× 6 / × □)

d) $\frac{7}{9} = \frac{35}{\square}$ (× □ / × □)

e) $\frac{5}{8} = \frac{30}{\square}$ (× □ / × □)

f) $\frac{1}{4} = \frac{\square}{16}$ (× □ / × □)

3 Fraction equivalence using division.

a) $\frac{45}{50} = \frac{\square}{\square}$ (÷ 5 / ÷ 5)

b) $\frac{36}{54} = \frac{6}{9}$ (÷ □ / ÷ □)

c) $\frac{72}{12} = \frac{\square}{2}$ (÷ □ / ÷ □)

d) $\frac{9}{81} = \frac{1}{\square}$ (÷ □ / ÷ □)

4 Use multiplication or division to find the equivalent fractions.

a) $\frac{5}{10} = \frac{\square}{90}$

b) $\frac{3}{4} = \frac{\square}{20}$

c) $\frac{3}{7} = \frac{\square}{28}$

d) $\frac{\square}{15} = \frac{24}{30}$

e) $\frac{2}{4} = \frac{\square}{20}$

f) $\frac{6}{\square} = \frac{30}{45}$

5 Use multiplication or division to find the equivalent fractions.

a) $\frac{1}{2} = \frac{\square}{6} = \frac{\square}{8}$

b) $\frac{1}{4} = \frac{3}{12} = \frac{5}{20}$

c) $\frac{3}{5} = \frac{6}{10} = \frac{9}{15}$

d) $\frac{4}{5} = \frac{20}{25} = \frac{24}{30}$

6 Identify equivalent fractions and put a (=). Identify inequivalent fractions and put a (≠)

a) $\frac{2}{3} \; 5 \; \frac{10}{15}$

b) $\frac{3}{4} \; \square \; \frac{1}{3}$

c) $\frac{3}{6} \; 2 \; \frac{6}{8}$

d) $\frac{1}{2} \; 50 \; \frac{50}{100}$

e) $\frac{3}{8} \; 3 \; \frac{9}{24}$

f) $\frac{2}{2} \; 2 \; \frac{5}{5}$

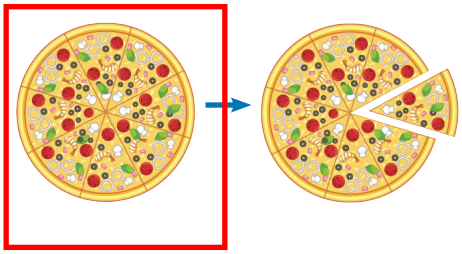
Exercise 3

1. Represent equivalent fractions of $\frac{1}{3}$ using number lines.
2. Check whether the fraction $\frac{5}{3}$ is equivalent to $\frac{16}{6}$.
3. In the denominator I have 24 and my equivalent fraction is $\frac{2}{3}$. What fraction am I?
4. Check whether the fraction $\frac{5}{10}$ is equivalent to $\frac{1}{2}$ using the number line.

Comparing fractions

Let's use the skills we learned in equivalent fractions to compare two or more fractions.

Safiyya had a pizza that was divided into 8 equal slices. She ate 1 of them.

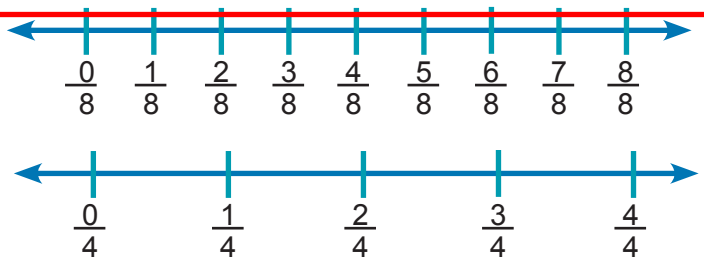


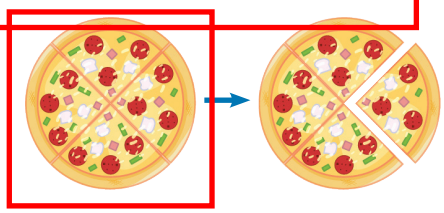
Raihana has a pizza that is the same size, but is divided into 4 equal slices.

She also ate 1 slice of her pizza. Who ate more pizza?

Safiyya ate $\frac{1}{8}$ while Raihana ate $\frac{1}{4}$. As you can see, Raihana ate more pizza than Safiyya.

$\frac{1}{4}$ is greater than $\frac{1}{8}$. Because Saffiyyas pizza is divided into more parts than Raihana's pizza. $\frac{1}{4} > \frac{1}{8}$

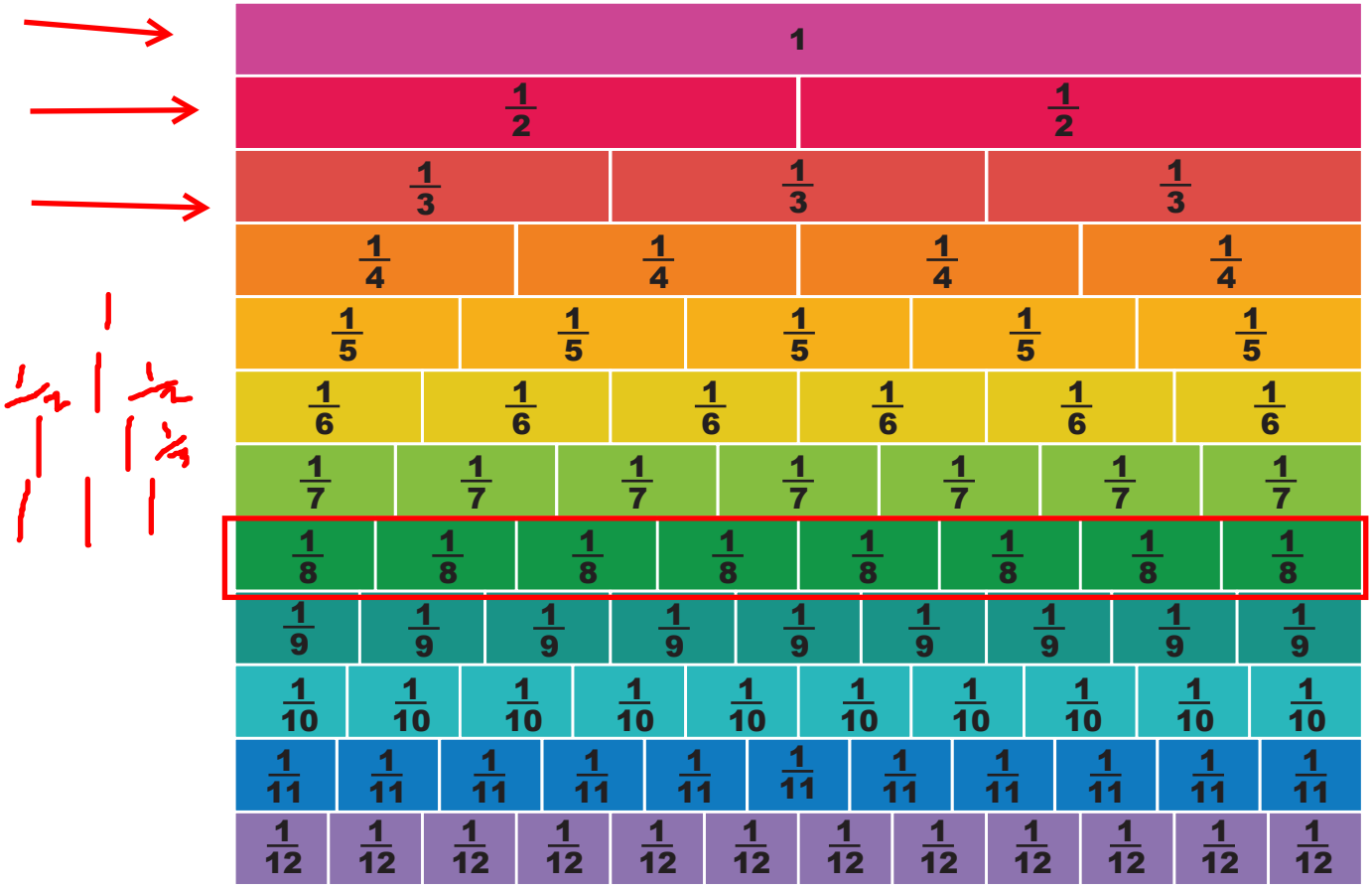


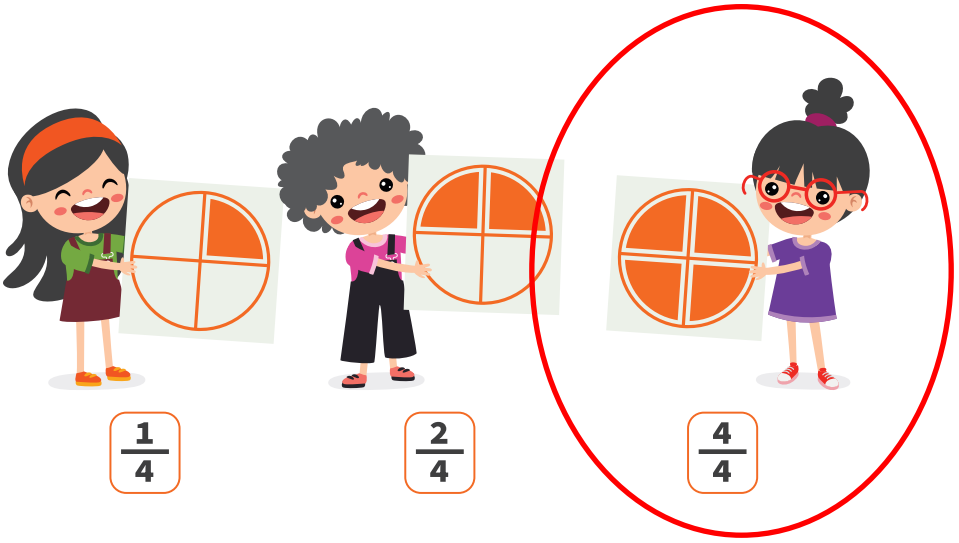


Let's investigate

Use different colours of papers to make a fraction wall as shown.

What does the fraction wall show? Investigate and explain how to recognize equivalent fractions using the fraction wall.





Exercise 4

1 Tick the fractions that are ordered correctly.

a) $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{8}$ $\frac{1}{2}$

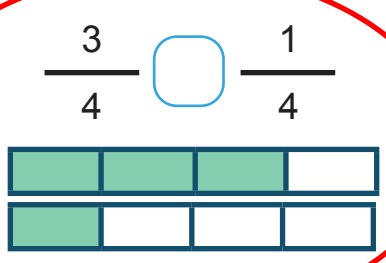
b) $\frac{1}{8}$ $\frac{1}{6}$ $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$

c) $\frac{1}{10}$ $\frac{1}{8}$ $\frac{1}{7}$ $\frac{1}{6}$ $\frac{1}{3}$

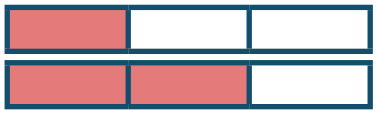
d) $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{5}$

2 Compare the following fractions using symbols > (greater than), < (less than) or = (equal to).

a) $\frac{3}{4} \square \frac{1}{4}$



b) $\frac{1}{3} \square \frac{2}{3}$



c) $\frac{5}{8} \square \frac{7}{8}$

d) $\frac{2}{7} \square \frac{4}{7}$

3 Compare the following fractions. Write > (greater than), < (less than) or = (equal to) between the fractions.

a) $\frac{6}{12} > \frac{3}{12}$

b) $\frac{3}{9} < \frac{5}{9}$

c) $\frac{4}{4} > \frac{3}{4}$

d) $\frac{3}{10} < \frac{9}{10}$

4 Compare and arrange the fractions in ascending order.

a) $\frac{6}{7}$ $\frac{3}{7}$ $\frac{4}{7}$ $\frac{2}{7}$

.....

b) $\frac{1}{5}$ $\frac{1}{9}$ $\frac{1}{10}$ $\frac{1}{7}$

.....

c) $\frac{3}{6}$ $\frac{1}{6}$ $\frac{5}{6}$ $\frac{4}{6}$

.....

d) $\frac{1}{8}$ $\frac{1}{7}$ $\frac{1}{4}$ $\frac{1}{9}$

.....

5 Saudhiyya cut an orange into 6 equal slices and ate two of them. Ibraheem cut an orange (the same size as Saudhiyya) into 3 equal slices and ate one of them. Did they eat the same amount of oranges? Show your working.

.....

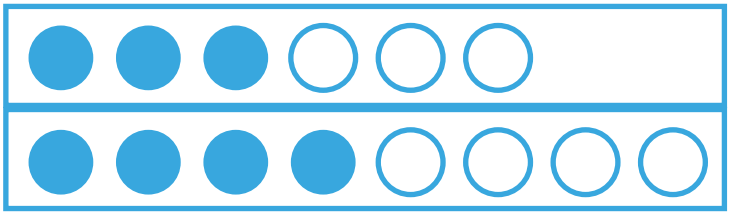
.....

.....

.....

.....

6 Are the fractions shown in the two rows equivalent? Prove your answer.



1

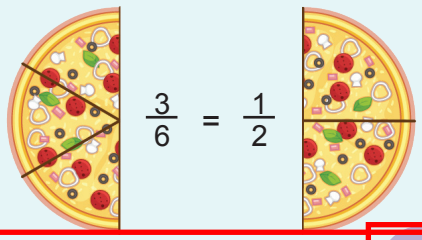
$\frac{3}{6}$ ☐ $\frac{4}{8}$ 6 3

Simplifying fractions

Simplifying a fraction means reducing it to its simplest form.

Example 1

Simplest form of fraction $\frac{3}{6}$



Factors of 3

3 = 3 x 1

6 = 3 x 2 x 1

Multiples

Factors of 6

First I found the factors of numerator and denominator. and then selected the common factor $\frac{3}{6} \frac{\div 3}{\div 3} = \frac{1}{2}$

Math Language

Factors are the numbers we can multiply together to get another number.
A multiple is the result of multiplying a number by an integer.

Example 2

There are 100 students in a pre-school. 60 students are girls. What fraction of the students are girls? Give the fraction in its simplest form.
The total number of students = 100.
The total number of girls = 60.

Therefore, $\frac{60}{100}$ are girls.

Hawwa's method:

Hawwa: I tried to divide both the top and bottom of the fraction by 2, 2, 5 until I can't go any further.
This is my working:

In simplest form: $\frac{60}{100} \frac{\div 2}{\div 2} = \frac{30}{50} \frac{\div 2}{\div 2} = \frac{15}{25} \frac{\div 5}{\div 5} = \frac{3}{5}$

60 = 2 x 2 x 5 x 3 100 = 2 x 2 x 5 x 5

Fathma's method:

Fathma: I want to use a different method to simply the fraction $\frac{60}{100}$.

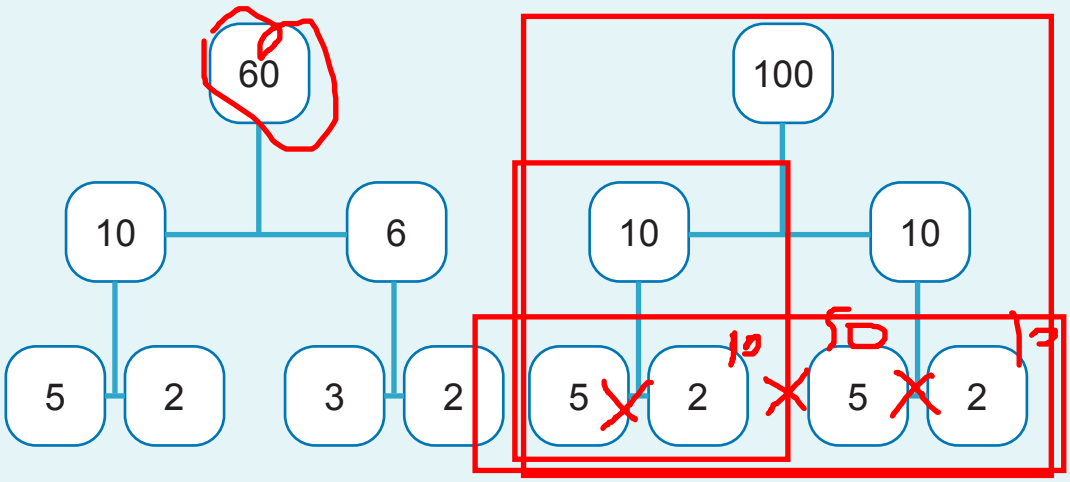
We have already studied division by 10, 100 and 1000. And here we have 60 and 100. So firstly, I would use division by 10 to find the answer and then divide by 2.
Here is my working.

$$\frac{60}{100} \frac{\div 10}{\div 10} = \frac{6}{10} \frac{\div 2}{\div 2} = \frac{3}{5}$$

60 = 10 x 2 x 3 100 = 10 x 2 x 5

Ayyoob's method:

I am going to find factors using a tree diagram and then simplify the fraction $\frac{60}{100}$.
Here is my working.



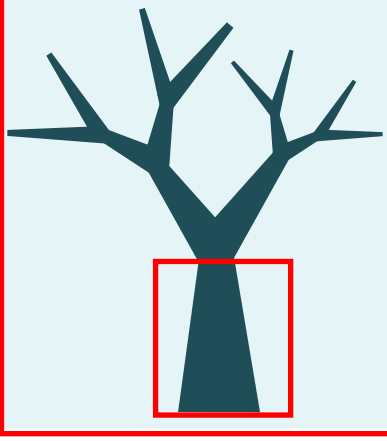
60 = 2 x 5 x 2 x 3
= 20 x 3

100 = 2 x 5 x 2 x 5
= 20 x 5

$$\frac{60 \div 20}{100 \div 20} = \frac{3}{5}$$

Math Language

Tree diagram: A diagram branching into 2 or more, each of which branch into 2 or more, and so on. The finished diagram bears a resemblance to a tree, with a trunk and multiple branches.



Let's investigate

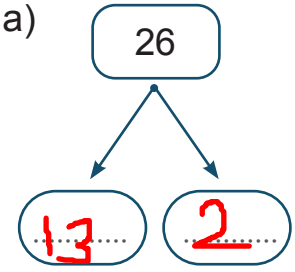
Compare the 3 methods of simplifying fractions. What is the difference between the three methods? What do you think of Ayyoob's method? Share your findings.

Discuss the situations where you can use Fathma's method and give ONE example.

Exercise 5

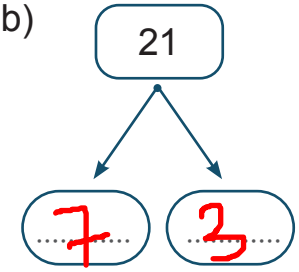
1 Complete the following tree diagrams.

a)



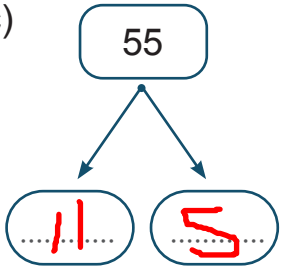
26 = 13 x 2

b)



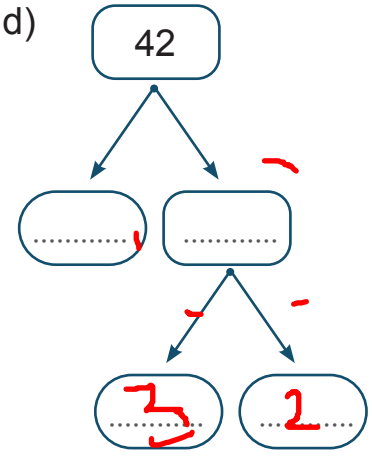
21 = 7 x 3

c)



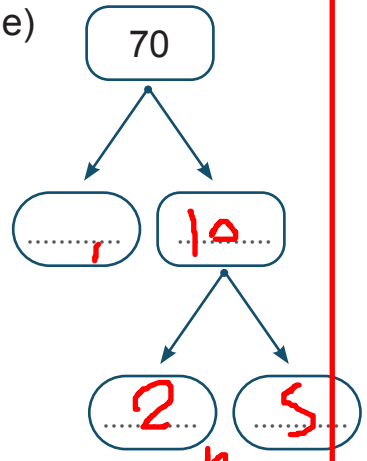
55 = ... x .....

d)



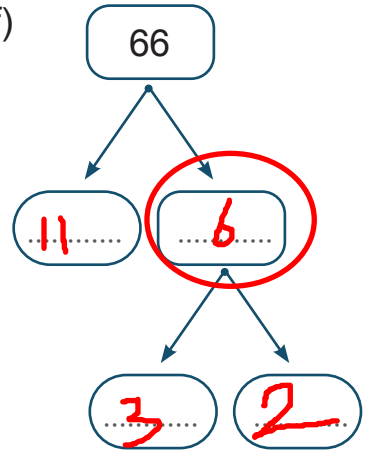
42 = 3 x 2 x 7

e)



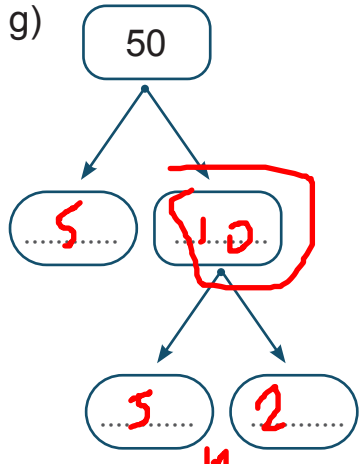
70 = 2 x 5 x 7

f)



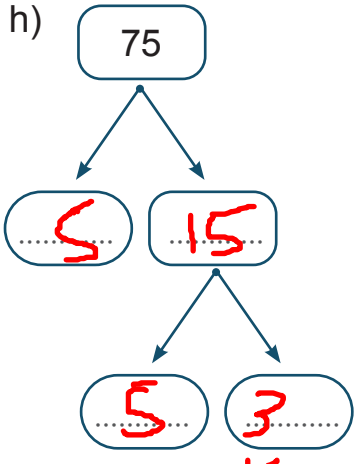
66 = 3 x 2 x 11

g)



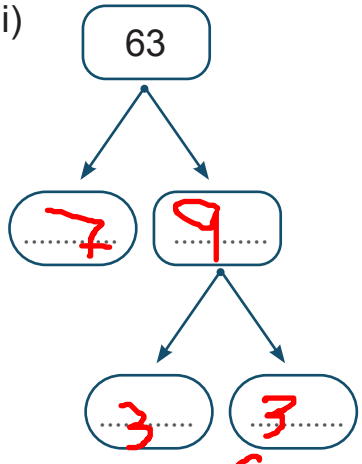
50 = 5 x 2 x 5

h)



75 = 5 x 3 x 5

i)



63 = 3 x 3 x 7

2 Use your answers of question 1 to simplify the following fractions.

a) $\frac{42}{63}$

b) $\frac{70}{75}$

c) $\frac{50}{55}$

d) $\frac{21}{70}$

3 Simplify the following fractions. You may use a tree diagram or a strategy of your choice.

a) $\frac{10}{15}$

b) $\frac{9}{15}$

c) $\frac{8}{12}$

d) $\frac{10}{14}$

e) $\frac{6}{21}$

f) $\frac{300}{500}$

g) $\frac{20}{30}$

h) $\frac{18}{22}$

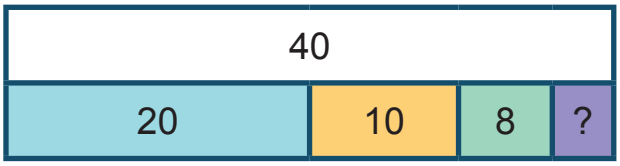
Exercise 6

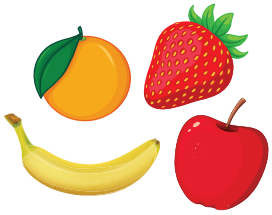
1 In Faisal's purse, 4 out of 10 pens are blue and rest of the pens are black.

What fraction of the pens are black? Give your answer in its simplest form.

2 Dawood has 40 fruits. 20 of the fruits are oranges, 10 of the fruits are apples, 8 of the fruits are strawberries. The rest of the fruits are bananas.

a) Find out the number of bananas.

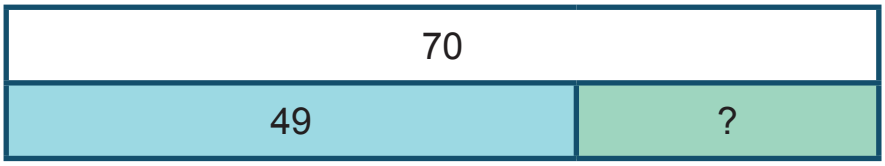




b) What fraction of the fruits are oranges? Write the fraction in its simplest form.

3 Saeedha spent ﷼ 49 out of ﷼ 70 to buy a book.

a) How much money does Saeedha have left?



b) What fraction of money did she spend? Write the fraction in its simplest form.

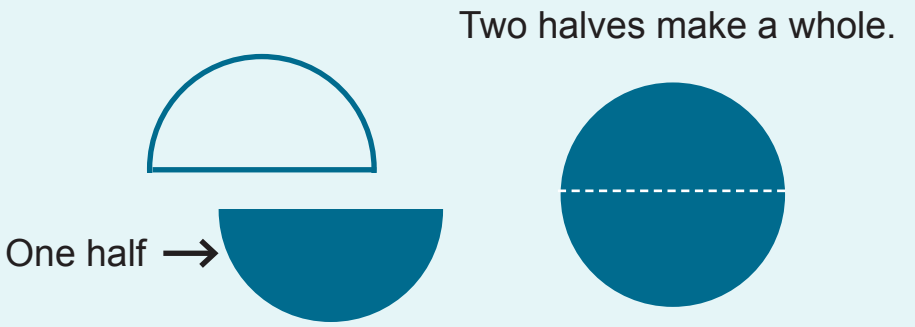
Addition and subtraction of fractions

Let's recall

Let's recall what we have learned in grade 3.

1 Make wholes by adding fractions. Use coloured paper, models or counters.

Example:
How many halves make a whole?



a) How many one-thirds make a whole?

.....

b) How many one-fourths make a whole?

.....

c) How many one-fifths make a whole?

.....

2 Write a mathematical equation for each of the above question.
Eg: $\frac{1}{2} + \frac{1}{2} = 1$

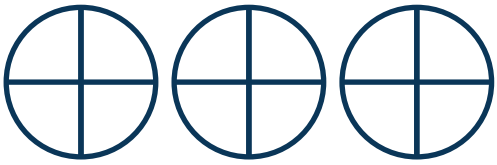
a) .....

b) .....

c) .....

3 Add the following fractions by colouring the relevant parts.

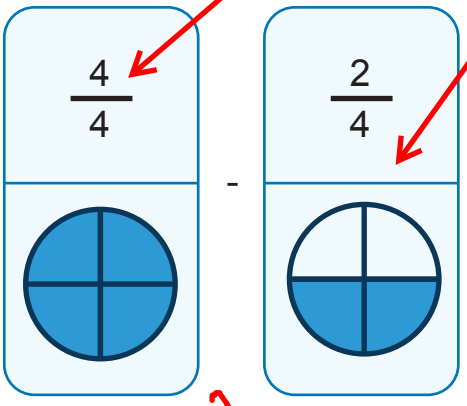
a) $\frac{2}{4} + \frac{1}{4} + \frac{1}{4} =$ .....



b) $\frac{2}{5} + \frac{1}{5} + \frac{1}{5} =$ .....

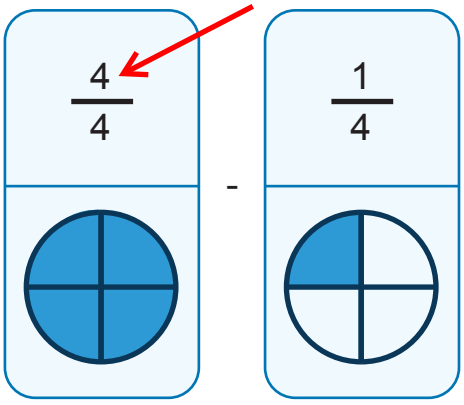
4 Subtract the fractions.

a)



Answer: $\frac{2}{4}$

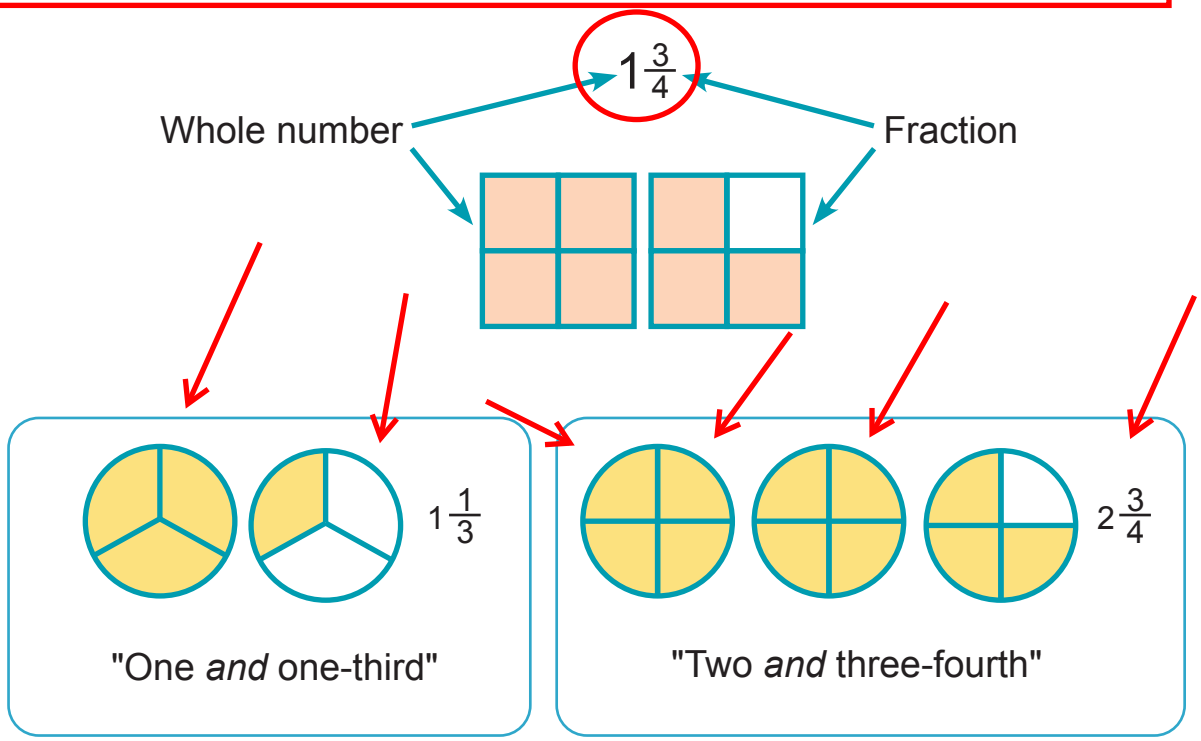
b)



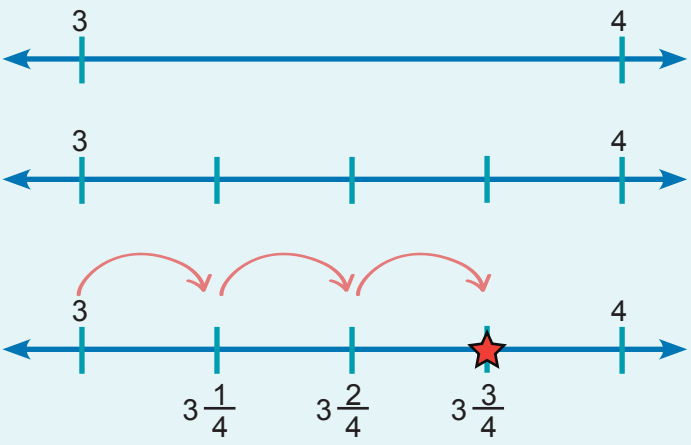
Answer: $\frac{3}{4}$

Mixed numbers

A **mixed number** consists of a whole number and a fraction.



Example: Represent $3\frac{3}{4}$ on number line.



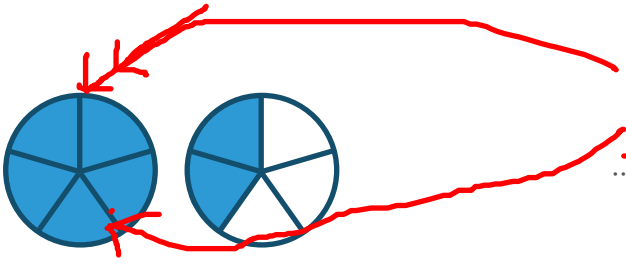
Let's collaborate

Adam has two chocolates. His sister gave $\frac{1}{4}$ of her chocolate to Adam. In total, Adam got 2 chocolates and a quarter of a chocolate.

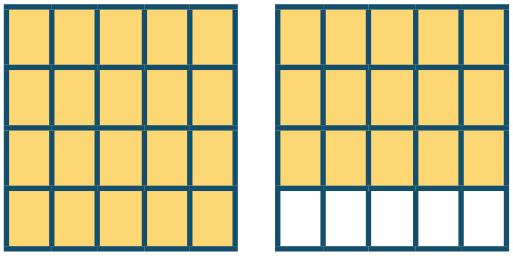
In groups, represent this information as an equation and show the answer on a number line.

Exercise 7

1 Write a mixed number for the illustrations.

a) 

$1\frac{2}{4}$

b) 

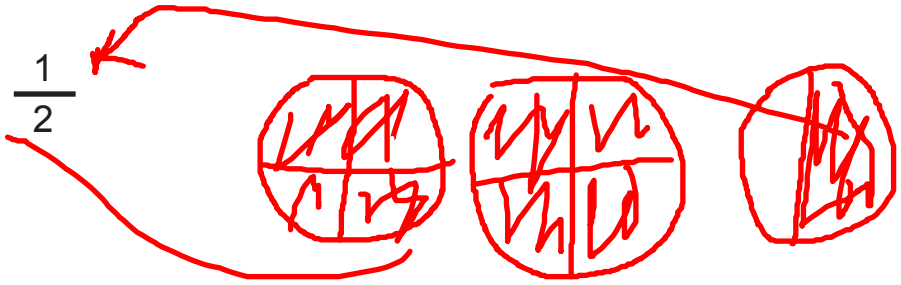
$1\frac{15}{20}$

c) 

$2\frac{4}{6}$

2 Draw pictures to illustrate the mixed numbers.

a) $2\frac{1}{2}$



b) $6\frac{1}{5}$

c) $3\frac{1}{3}$

3 Mark the mixed numbers on the number lines.

a) $1\frac{2}{6}$, $2\frac{1}{6}$, $2\frac{5}{6}$

b) $1\frac{5}{8}$, $1\frac{1}{8}$, $2\frac{4}{8}$, $2\frac{6}{8}$

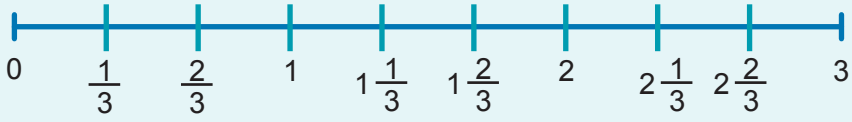
c) $1\frac{1}{5}$, $3\frac{4}{5}$, $2\frac{2}{5}$, $4\frac{3}{5}$

Addition and subtraction of fractions

In addition, when the denominators are the same, just add the numerators.
In subtraction, when the denominators are the same, just subtract the numerators.

Example 1

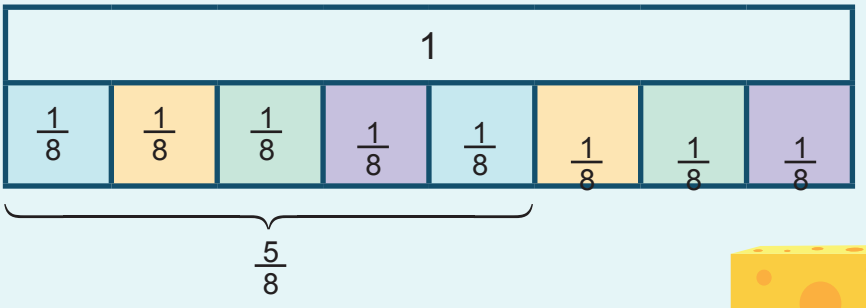
Aafiya is counting in one-thirds. She writes each number on a number line starting from 0 to 3.



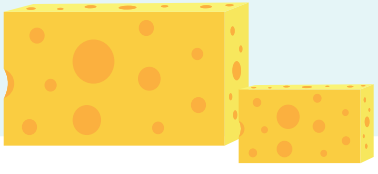
Discuss Aafiya's number line.

Example 2

Asma grated $\frac{5}{8}$ of a block of cheese to bake a pie. What fraction of the cheese block is left?



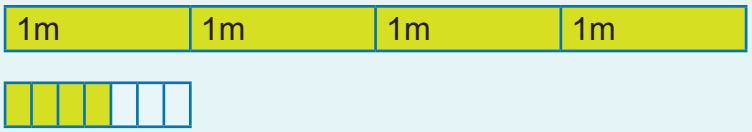
$\frac{3}{8}$ of the cheese block is left.



Example 3

Abeera jumped $4\frac{4}{7}$ m in the long jump competition. Zahra jumped $4\frac{5}{7}$ m. Who jumped longer, and how many meters?

Abeera: $4 + \frac{4}{7}$ m



Zahra: $4 + \frac{5}{7}$ m

STEP 1: First compare the whole numbers. Whole numbers are same.

STEP 2: Then compare the fractions $\frac{4}{7}$ and $\frac{5}{7}$.
A fraction is a part of whole. The fractions show that 1 whole is divided into 7 parts. Abeera jumped 4 out of 7 metres and Zahra jumped 5 out of 7 metres.
5 is greater than 4. Therefore, Zahra jumped longer.
How many metres longer?

$$4\frac{5}{7} - 4\frac{4}{7} = 4 - 4\frac{5-4}{7} = \frac{1}{7}$$

Zahra jumped $\frac{1}{7}$ metres longer.

Zahra jumped longer than Abeera.

Exercise 8

1 Find the sum.

a) $\frac{1}{3} + \frac{1}{3} =$ .....

b) $\frac{4}{8} + \frac{3}{8} =$ .....

c) $\frac{8}{16} + \frac{10}{16} =$ .....

d) $\frac{3}{12} + \frac{6}{12} =$ .....

e) $5\frac{2}{4} + \frac{2}{4} =$ .....

f) $4\frac{6}{10} + \frac{4}{10} =$ .....

g) $5\frac{1}{3} + \frac{2}{3} =$ .....

h) $4\frac{8}{9} + \frac{2}{9} =$ .....

i) $7\frac{2}{7} + \frac{1}{7} =$ .....

j) $2\frac{3}{11} + \frac{9}{11} =$ .....

2 Find the sum.

a) $5\frac{5}{12} + 4\frac{11}{12} =$ .....

b) $1\frac{1}{2} + 7\frac{1}{2} =$ .....

c) $7\frac{2}{3} + 7\frac{2}{3} =$ .....

d) $8\frac{7}{11} + 3\frac{2}{11} =$ .....

e) $10\frac{4}{5} + 8\frac{3}{5} =$ .....

f) $7\frac{3}{6} + 8\frac{2}{6} =$ .....

3 Find the difference.

a) $\frac{10}{12} - \frac{3}{12} =$ .....

b) $\frac{6}{10} - \frac{5}{10} =$ .....

c) $\frac{3}{4} - \frac{2}{4} =$ .....

d) $\frac{7}{11} - \frac{2}{11} =$ .....

e) $\frac{4}{6} - \frac{3}{6} =$ .....

f) $\frac{10}{12} - \frac{4}{12} =$ .....

4 Find the difference.

a) $3\frac{3}{5} - 1\frac{2}{5} =$ .....

b) $2\frac{4}{5} - 1\frac{3}{5} =$ .....

c) $4\frac{3}{4} - 1\frac{1}{4} =$ .....

d) $4\frac{5}{6} - 3\frac{1}{6} =$ .....

e) $3\frac{2}{3} - 1\frac{1}{3} =$ .....

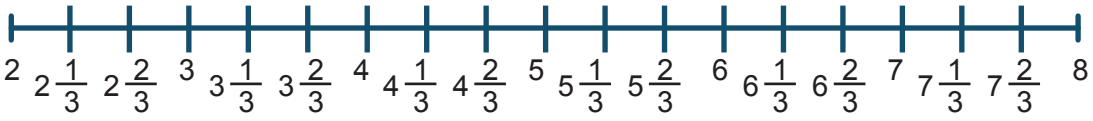
f) $2\frac{3}{5} - 1\frac{2}{5} =$ .....

Exercise 9

1. Create your own number line by counting on one-fifth from 0 to 5.

2. The mass of Saleem's bag is $6\frac{1}{3}$ kg. Basheera's bag is $1\frac{1}{3}$ kg lighter than Saleem's.

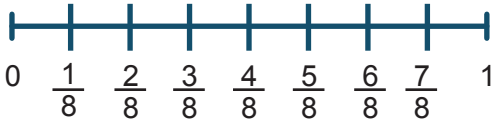
   a) How much does Basheera's bag weigh?



   b) How much does the bags weigh altogether?

Total weight of 2 bags	
Weight of Basheera's bag	Weight of Saleem's bag

3. Balgis had $\frac{5}{8}$ of a jar of candy left. She shared some of the candies with her friends and now she is left with $\frac{3}{8}$ of the jar. What fraction of the candy was shared with her friends?



4. Ameena took $1\frac{1}{4}$ hours to paint a table and $\frac{1}{4}$ hours to paint a chair. How much time did she take in all? Give your answer in minutes.

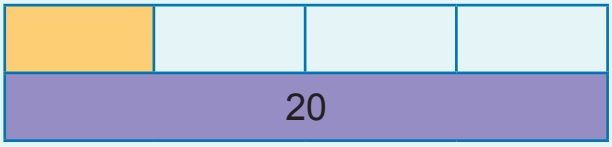
Total time	
$1\frac{1}{4}$	$\frac{1}{4}$

Fractions of a quantity

Example 1

1. Aira wants to give $\frac{1}{4}$ of 20 coins to her brother. How many coins are $\frac{1}{4}$ of 20?
We need to find a quarter of 20.

$20 \div 4 = 5$

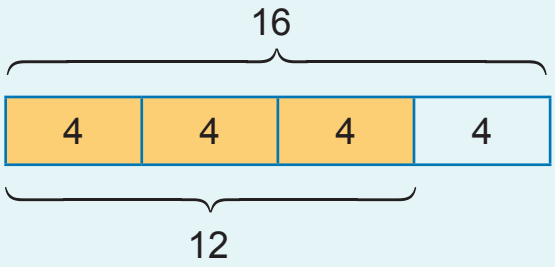


2. Find $\frac{3}{4}$ of 16.

$\frac{3}{4} \times 16$

$= \frac{16}{4} = 4$

$= 4 \times 3 = 12$



Example 2

1. A farm in AA.Thoddoo is 700 ft^2. The area of watermelon field covers $\frac{4}{7}$ of total area of the farm.
Calculate the area of watermelon field.

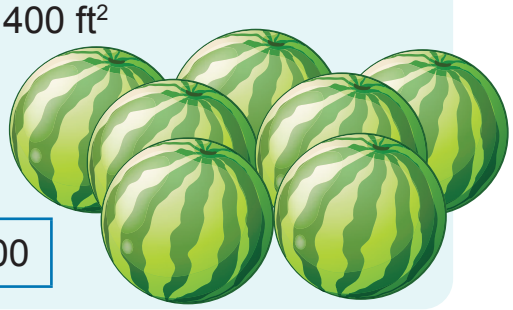
Area of watermelon field = $\frac{4}{7} \times 700 =$ 400 ft^2

First divide 700 by 7

$700 \div 7 = 100$

$100 \times 4 = 400$

100	100	100	100	100	100	100



Math Language

In groups, discuss the following terms related to fractions.
Represent each word using visual models.

equal part, equal grouping, equal sharing, parts of a whole, half, two halves, one of two equal parts, quarter, two quarters, three quarters, one of four equal parts, one thirds, two thirds, one of three equal parts, sixths, sevenths, eighths, tenths

Exercise 10

1. The total score of a test was 50 marks. Nasir scored $\frac{3}{5}$ of the total marks. How many marks did he score?

2. In a conference hall, $\frac{1}{2}$ of the people are women. The total number of people in the conference is 860. Find the number of women in the hall.

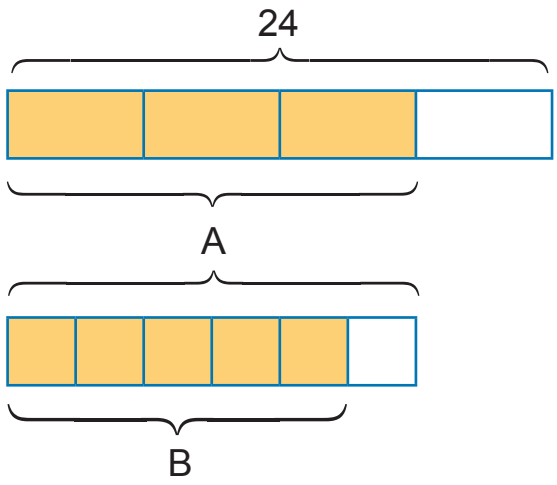
3. Below is the recipe for 4 smoothies. Riza needs only half of the amount of that smoothie. How much of each ingredient will he need?

   20 strawberries
   4 bananas
   400ml of milk
   24 raspberries
   1 spoon yogurt

4. Zulfa and Fathih are calculating $\frac{1}{5}$ of 30.
   Zulfa: The answer is 6.
   Fathih: The answer is 5.
   Who is correct? Explain your answer.

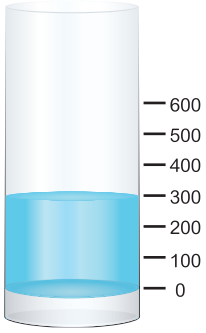
Put your thinking cap on

1 Find the value of A and B.



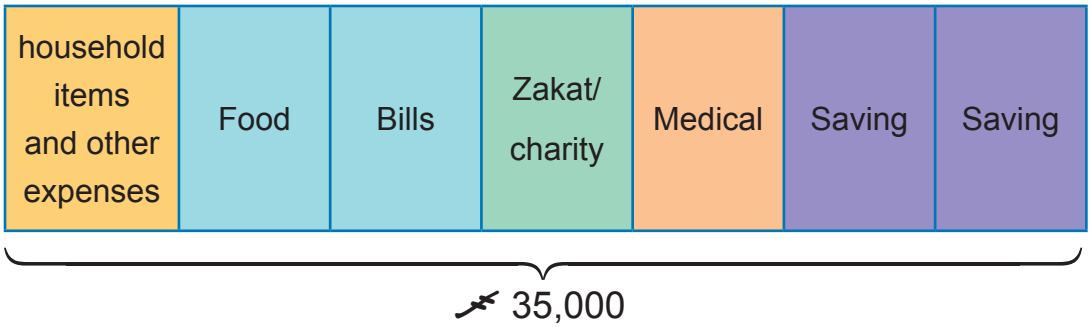
2 Nadha and Fazeel made juice. They used $\frac{6}{7}$ of water in a jug and were left with 300 ml water.
Find the initial amount of water they had.

Aisha: we should divide 300 by 6 and then multiply by 7.
Ali: No, we know that 300ml is $\frac{1}{7}$. so, we need to multiply 300 by 7.



Share your thinking Who is correct? Explain your answer.

3 Create a problem for the following bar model and share with your friends.



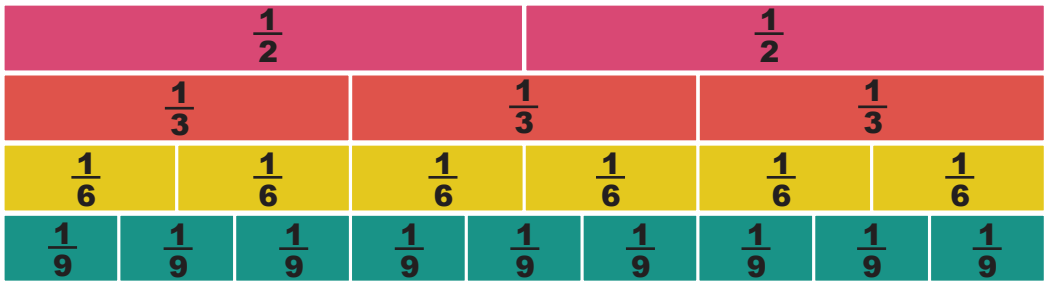
Self assessment

1 Kumra is using a fraction wall to compare fractions.
Write <, > or = to complete the statements.

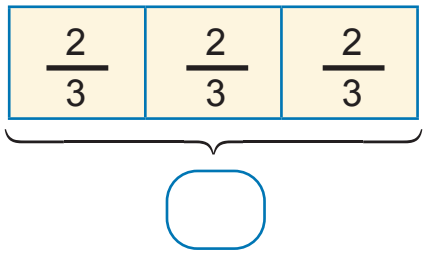
a) $\frac{1}{2}$ ☐ $\frac{1}{6}$

b) $\frac{2}{3}$ ☐ $\frac{5}{9}$

c) $\frac{8}{9}$ ☐ 1



2 Complete the missing box.



3 Find the value of ▲

▲ + $\frac{2}{5}$ = $\frac{3}{5}$

.....

4 Use a number line to represent the problem and find the answer.

$$\frac{5}{7} - \frac{3}{7}$$

5 Sameera and Abbas make lacquer ware and woven mats for a souvenir shop. The total earning of Sameera and Abbas from the souvenir shop is ₹ 2500. If Sameera earns $\frac{3}{10}$, find the total earning of Abbas. Give your answer in its simplest form.

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

I am good at ……

The mistakes I did are ……

What I learned from my mistakes are ……

Unit 8

Decimals

I will learn to:

- Read and write tenths and hundredths in decimal notation.
- Recognise the place value of each digit in decimals.
- Place decimals on a number line.
- Express money in decimals.

Math mindset

I make mistakes.
That's ok! Mistakes help me learn and improve.

Warm up

Cut a rectangle. Divide the rectangle into 10 equal parts. Colour 1 part. What fraction of the paper is coloured?

Tenths

Example 1

In the above activity, you have coloured 1 out of 10 parts. We represent 1 out of 10 as $\frac{1}{10}$

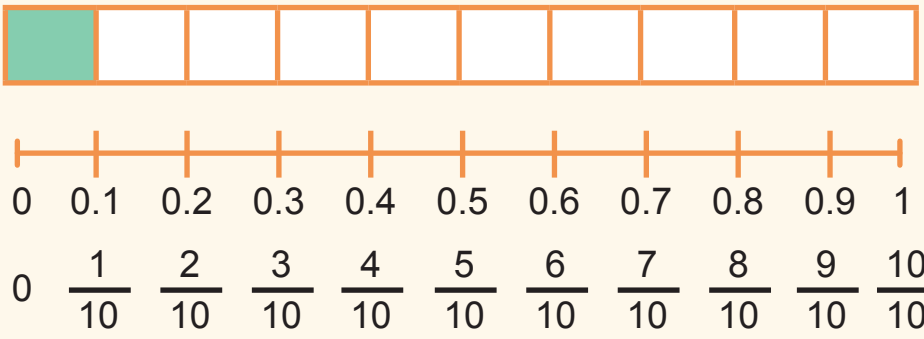
In decimals, we write $\frac{1}{10}$ as 0.1.

We read 0.1 as

$\frac{1}{10}$

zero point one.

Look at the following number line. The number line is divided into 10 equal parts.



1 out of 10 means 1 part out of 10 equal parts.

1									
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

There are ten zero-point ones in 1.

Similarly, 2 out of ten is same as two tenths or 0.2, $\frac{2}{10}$ and 3 out of ten is same as three tenths or 0.3 or $\frac{3}{10}$.

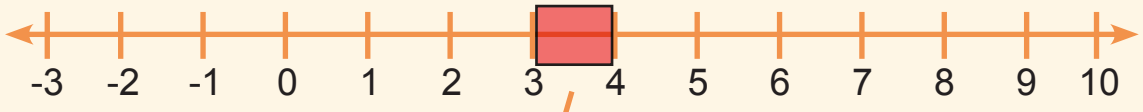
How do you show 3.4 on a number line?

Example 2

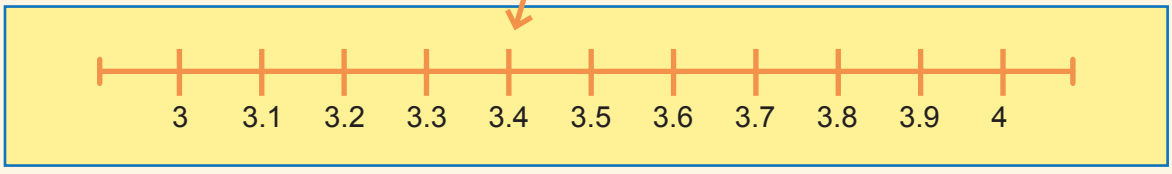
3.4 is same as $3\frac{4}{10}$

Let's look at another example.

Faisal wants to represent 3.4 on a number line.
First he draws a number line and identifies the position of 3.4.



Secondly, he draws numbers between 3 and 4 and identify exact position of 3.4



Share your thinking

Discuss the work of Faisal.
What do you think of the relationship between fractions and decimals? Do you notice any pattern? Present your findings.

Example 3

Let's investigate

Look at the place value chart of the decimal number and recall the place value chart of whole numbers. What is the difference?

Example: 25.3 ← 1 decimal place

Tens	Ones		Tenths
10 10	1 1 1 1 1		0.1 0.1 0.1
2	5	.	3

A decimal point separates whole number part from the decimal part.

The digit 2 is in the tens place. Its value is 20.
The digit 5 is in the ones place. Its value is 5.
The digit 3 is in the tenths place. Its value is 0.3
25.3 = 20 + 5 + 0.3

$0.3 = \frac{3}{10}$

$25.3 = 25\frac{3}{10}$

Decimal number bonds to 1 with tenths

Number bonds are pairs of numbers that add up to a specific number.

Let's recall

Let's recall number bonds of 10.

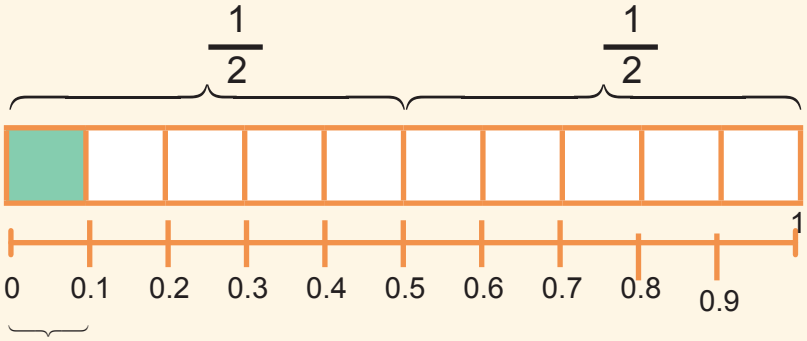
1 + 9	10
2 + 8	10
3 + 7	10
4 + 6	10
5 + 5	10

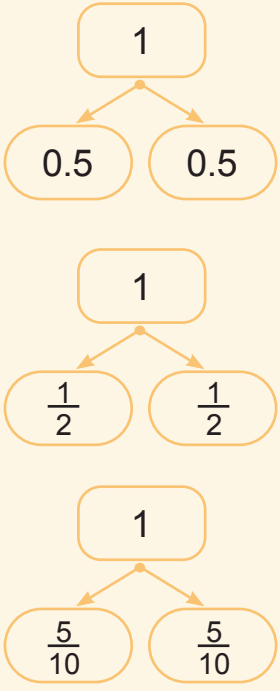
Similarly, number bonds to 1 are the numbers that add up to number 1.

Lets see few examples.

Example 1

Find the value of 0.5 + 0.5





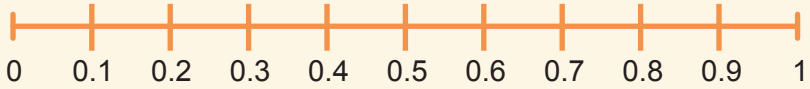
The diagram shows $0.5 = \frac{5}{10} = \frac{1}{2}$

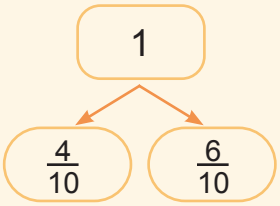
$\frac{1}{2} + \frac{1}{2} = 1$ or in decimals,

0.5 + 0.5 = 1

Example 2

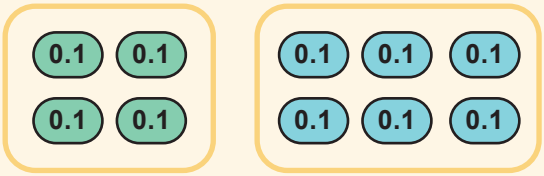
Sameera was asked to make a decimal number bond to 1. She used the following number line.





Sameera's answer: 0.4 + 0.6 = 1

0.4 + 0.6 = 1



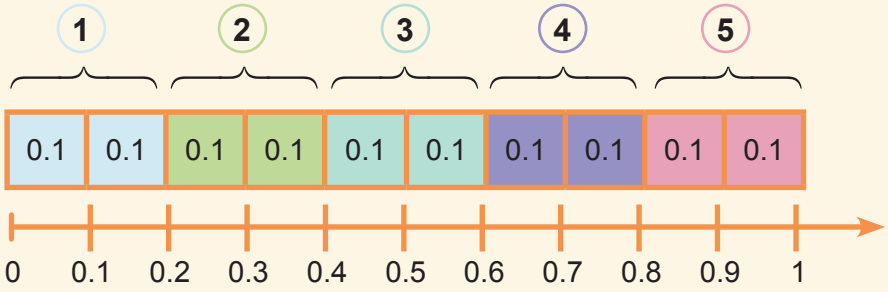
4 + 6 = 10
40 + 60 = 100
400 + 600 = 1000
$\frac{4}{10} + \frac{6}{10} = 1$
0.4 + 0.6 = 1

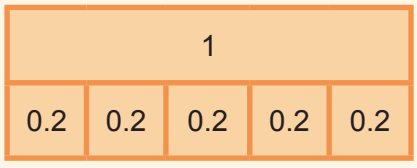
I recalled the bonds of 10 and applied the pattern. For example;

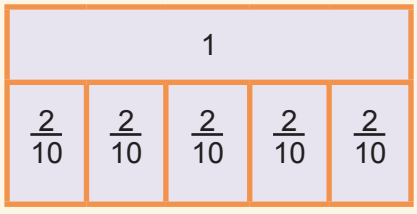
4 + 6 = 10
0.4 + 0.6 = 1
3 + 7 = 10
0.3 + 0.7 = 1

Example 3

How many times do you have to add 0.2 to get 1?







There are FIVE zero-point twos in 1.

Example 4

Write number facts of 1 using 0.9 and 0.1.

0.1 + 0.9 = 1
0.9 + 0.1 = 1
1 – 0.1 = 0.9
1 – 0.9 = 0.1

Let's collaborate

Discuss the above examples. What do you notice? What is common in these equations? Come up with two such examples and share with your partner.

Exercise 1

1 Complete the following place value chart.

Number	Thousands	Hundreds	Tens	Ones		Tenths
23.2			2	3	.	2
502.3						
2,015.4						
50.6						

2 Write the numbers represented by the place value charts.

a)

Ones		Tenths
1 1 1 1	.	0.1 0.1

.....

b)

Ones		Tenths
	.	0.1 0.1 0.1 0.1 0.1

.....

3 Show each number on a place value chart.

a) 12.9
b) 53.7
c) 306.8

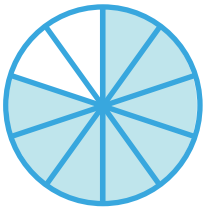
4 What number does the model represent? Write it as a fraction and as a decimal.

a)

$\frac{2}{10}$ = 0.2

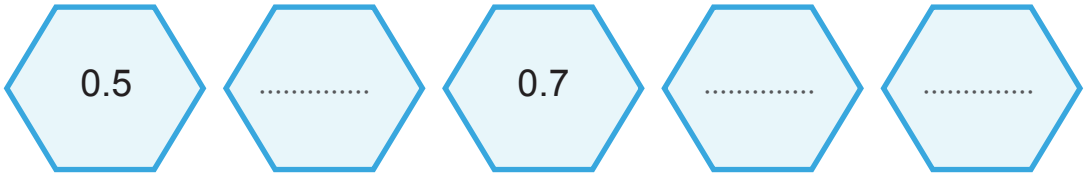
b)

c)



d)

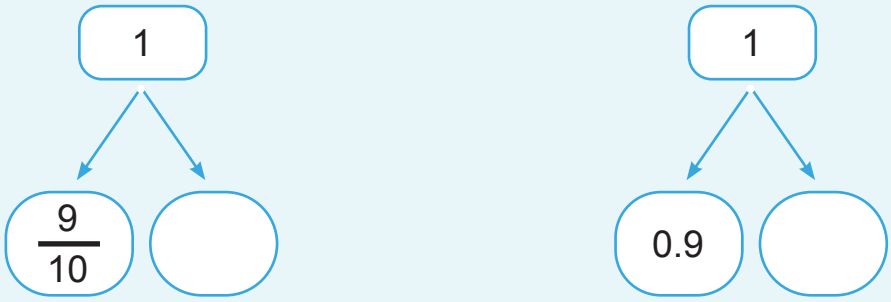
5 Study and complete the decimal pattern.



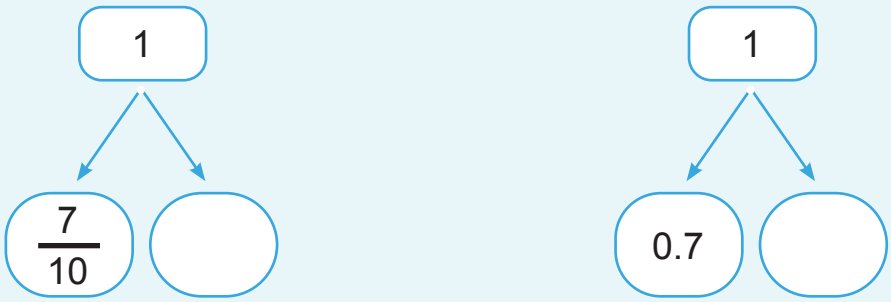
Exercise 2

1 Complete the part whole models.

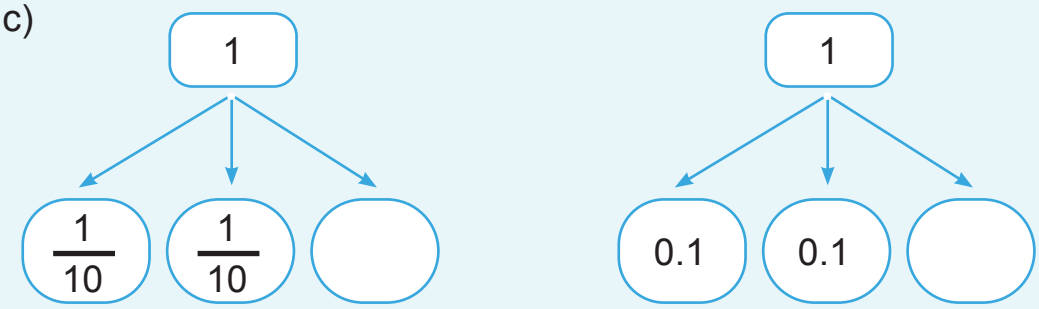
a)



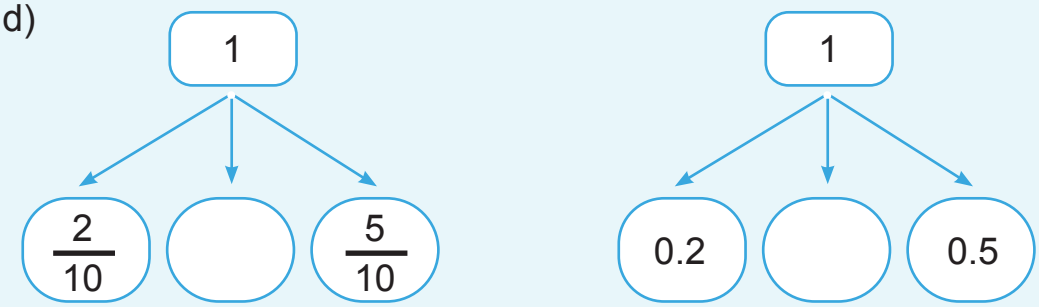
b)



c)

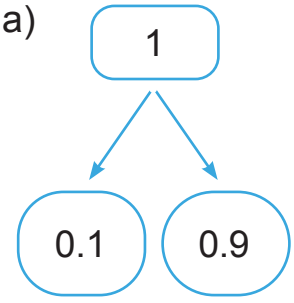


d)



2 Fill in the missing numbers in the models to make 1 and complete the calculations.

a)



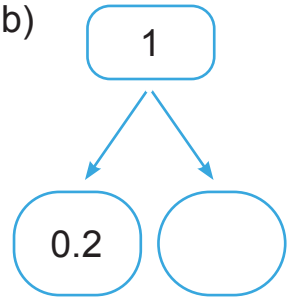
0.1 + 0.9 = 1

0.9 + 0.1 = 1

1 – 0.1 = 0.9

1 – 0.9 = 0.1

b)



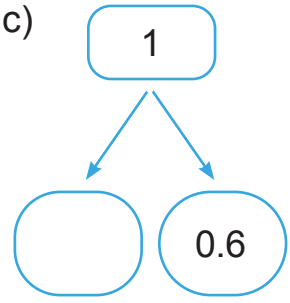
..... + ... = 1

..... + ... = 1

1 – ..... = ...

1 – ..... = ...

c)



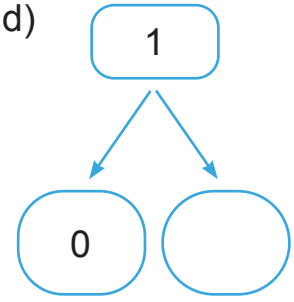
..... + ... = 1

..... + ... = 1

1 – ..... = ...

1 – ..... = ...

d)



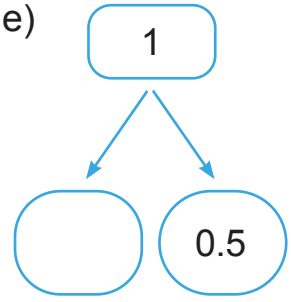
..... + ... = 1

..... + ... = 1

1 – ..... = ...

1 – ..... = ...

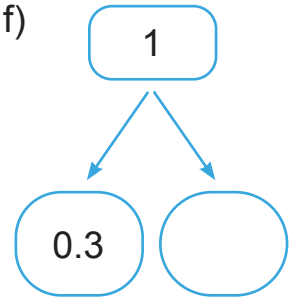
e)



..... + ... = 1

1 – ..... = ...

f)



..... + ... = 1

..... + ... = 1

1 – ..... = ...

1 – ..... = ...

Let's collaborate

In groups, complete the following decimal square up to 10.

Decimal Square
0.1 to 10

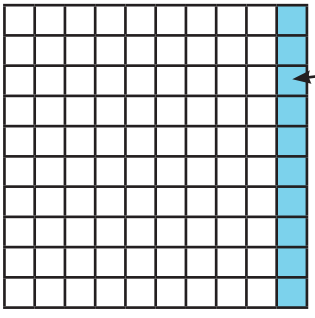
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3
3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4

Hundredths

Firstly, let's investigate the relationship between tenths and hundredths.
Make a hundred square grid using a square paper. Draw 10 columns and 10 rows.

When you colour 10 squares of the grid, it is written as $\frac{10}{100}$. In decimals $\frac{10}{100} = \frac{1}{10} = 0.1$.

Hundred Chart



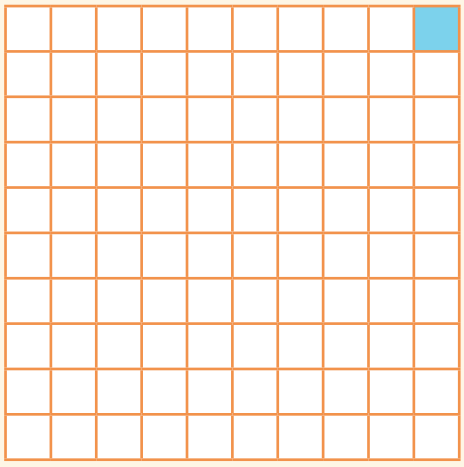
$\frac{10}{100}$ = 10 hundredths = 1 tenth

$\frac{10}{100}$ or 1 column out of 10 columns

Remember?
$\frac{10}{100}$ and $\frac{1}{10}$ are equivalent fractions.

When we colour 1 square of the 100 square grid, we write it as $\frac{1}{100}$.
In decimals it is 0.01.

Therefore $\frac{10}{100} = \frac{1}{10} = 0.1$ and $\frac{1}{100} = 0.01$



In tenths, there is 1 decimal place and in hundredths there are 2 decimal places.

The grid represents 0.01.

Let's investigate

10 hundredths make 1 tenth. How many hundredths make 2 tenths?
What is the pattern that you see?
Explain your thinking.

$\frac{10}{100} = 0.1$

$? = 0.2$

Example 2

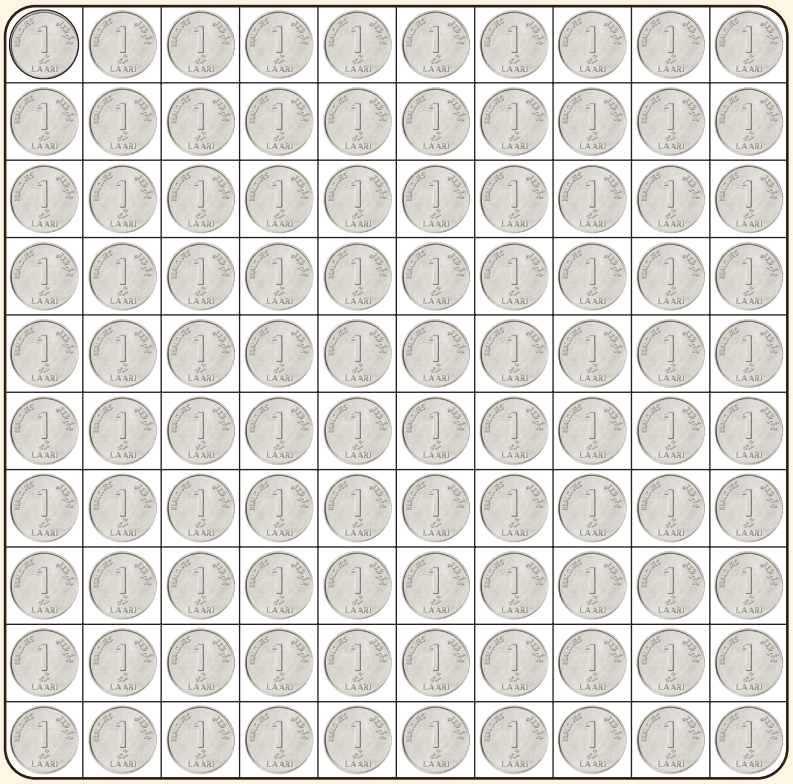
The value of 1 laari is ﷼ $\frac{1}{100}$ = 0.01

﷼ 1 is equal to 100 laari, or there are 100 laaris in ﷼ 1.

Lets use a diagram to represent this.

Math in Real Life

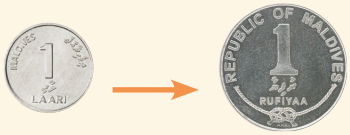
The diagram shows ﷼ 1.
Each square in the 100 chart equals 1 laari.



1 laari = ﷼ $\frac{1}{100}$

$\frac{1}{100}$ written as a decimal is 0.01.

We read 0.01 as zero point zero one.



100 laari ﷼ 1

Let's collaborate

In groups, discuss the following examples and find the number of 50 laari in ﷼ 500.

1: 100 laari = ﷼ 1, 1 laari = ﷼ $\frac{1}{100}$ = 0.01

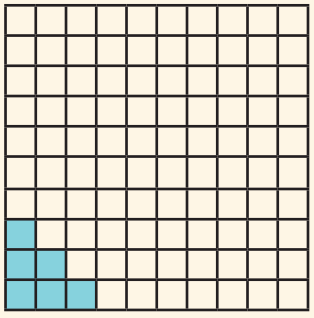
2: 200 laari = ﷼ 2, 2 laari = ﷼ $\frac{2}{100}$ = 0.02

3: 50 laari = ﷼ 0.5

4: ﷼ 2.5 = ﷼ 2 + ﷼ 0.5 = ﷼ 2.5 = ﷼ $2\frac{1}{2}$ = 250 laari

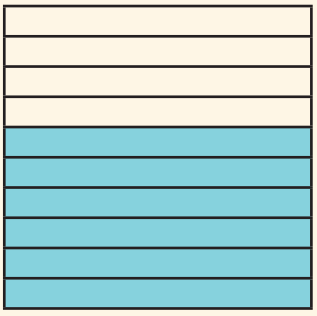
Example 3

Write the decimals for the following models using a place value chart.

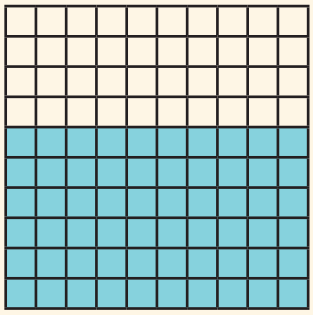
a) 

6 Hundredths $\frac{6}{100}$ = 0.06

Ones		Tenths	Hundredths
0	.	0	6

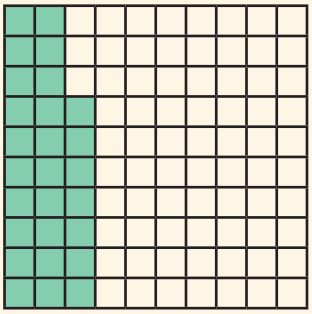


0.6
six tenths



0.06
six hundredths

b)

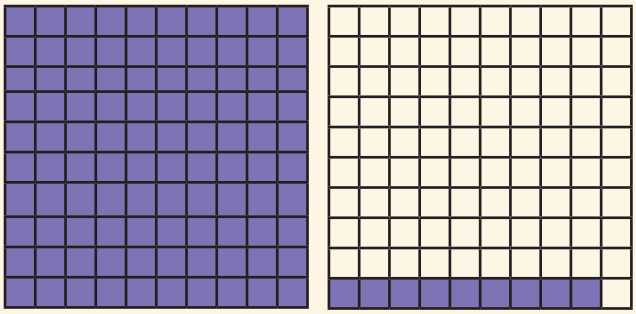


27 Hundredths
2 Tenths 7 Hundedths

$$\frac{27}{100} = 0.27$$

Ones		Tenths	Hundredths
0	.	2	7

c)

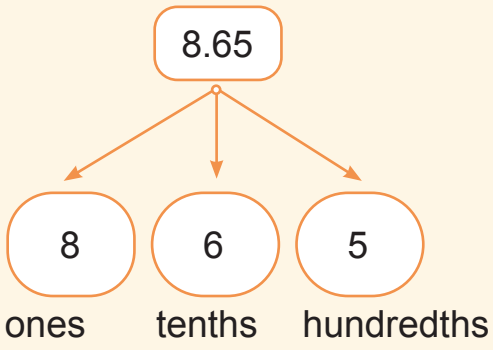


1 and 9 Hundedths

$$1\frac{9}{100}$$

Ones		Tenths	Hundredths
1	.	0	9

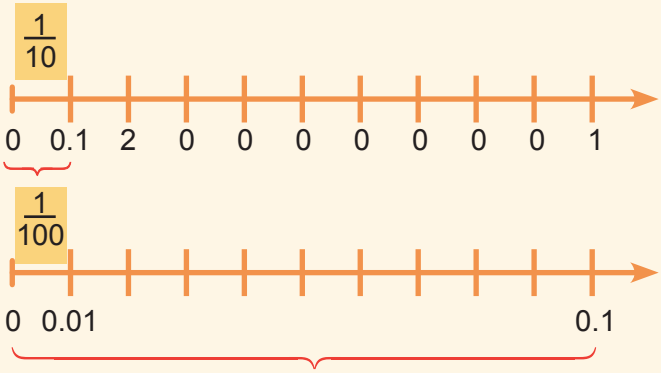
d)



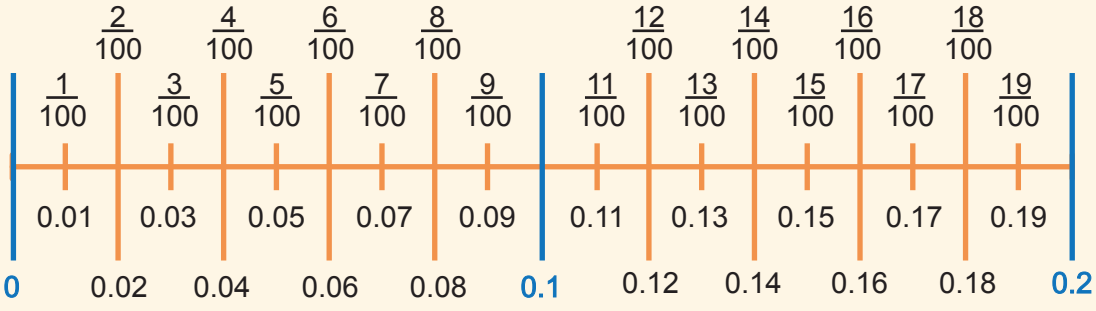
Ones		Tenths	Hundredths
8	.	6	5

Example 4

When we divide 1 unit into 100 equal pieces, we end up with hundredths. We can also get the size of 1 hundredth by dividing 1 tenth into equal pieces as shown below.



How do you show 0.01 on a number line?



Exercise 3

1. Roughly mark the given decimals on the number lines.

a) 0.56

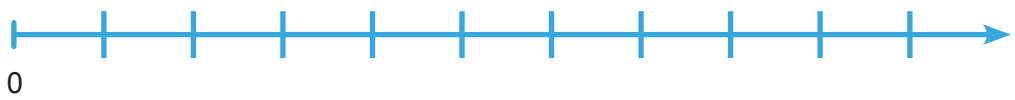
b) 0.33

c) 0.91

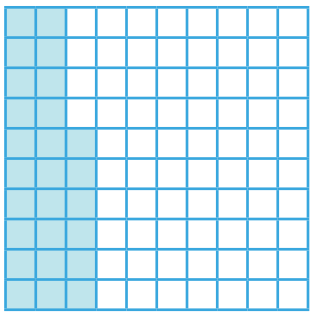
d) 0.67

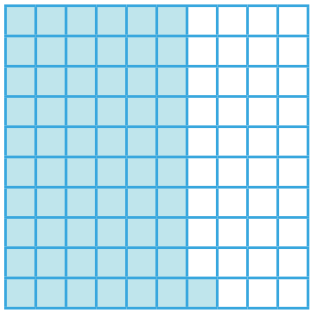
2. Represent the following on the number line.

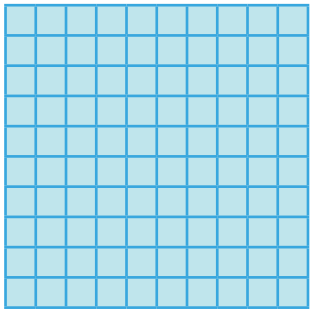
a) 0.06
b) 0.03
c) 0.09
d) 0.05

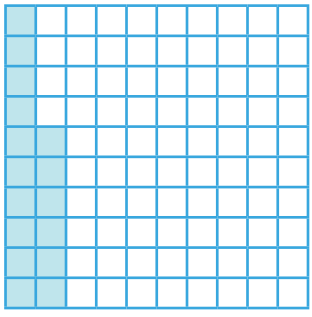


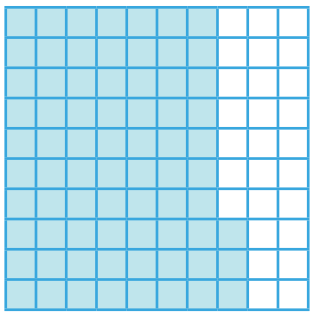
3 What is the decimal number each block represents?

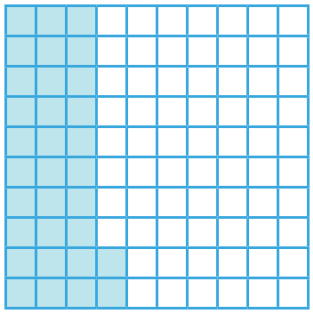
a)  .....

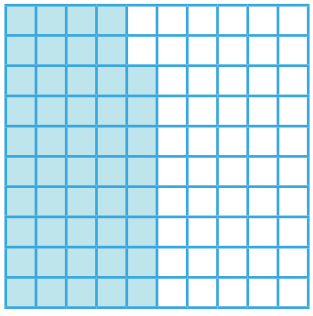
b)  .....

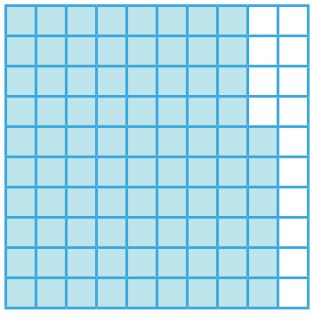
c)  .....

d)  .....

e)  .....

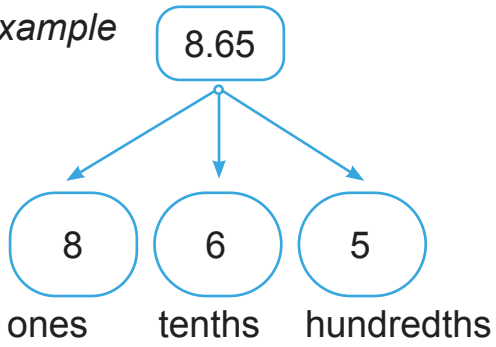
f)  .....

g)  .....

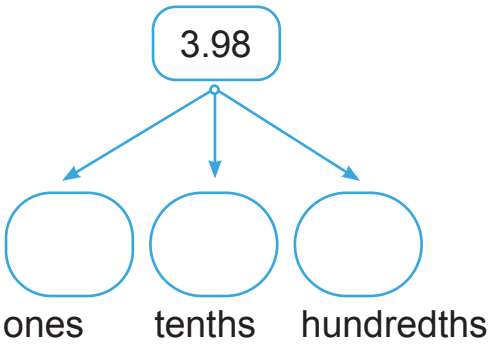
h)  .....

4 Complete the part whole models.

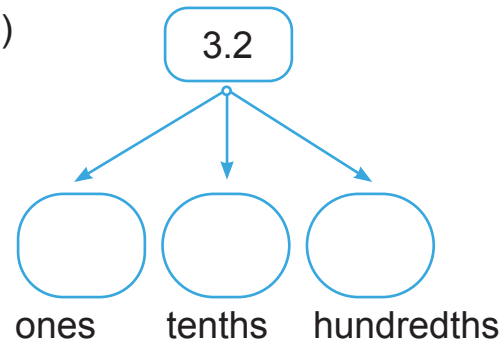
Example



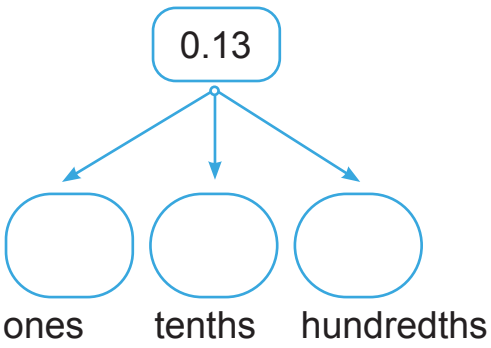
a)



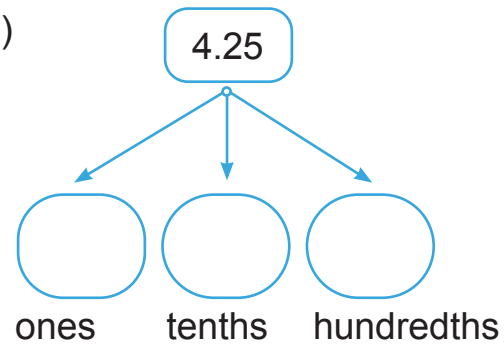
b)



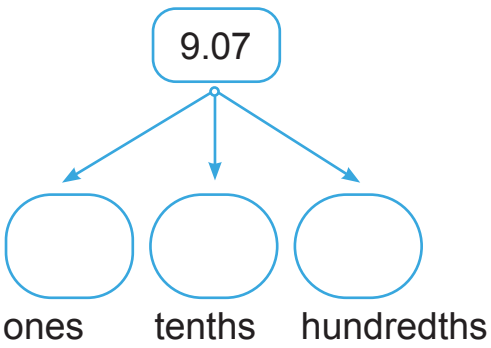
c)



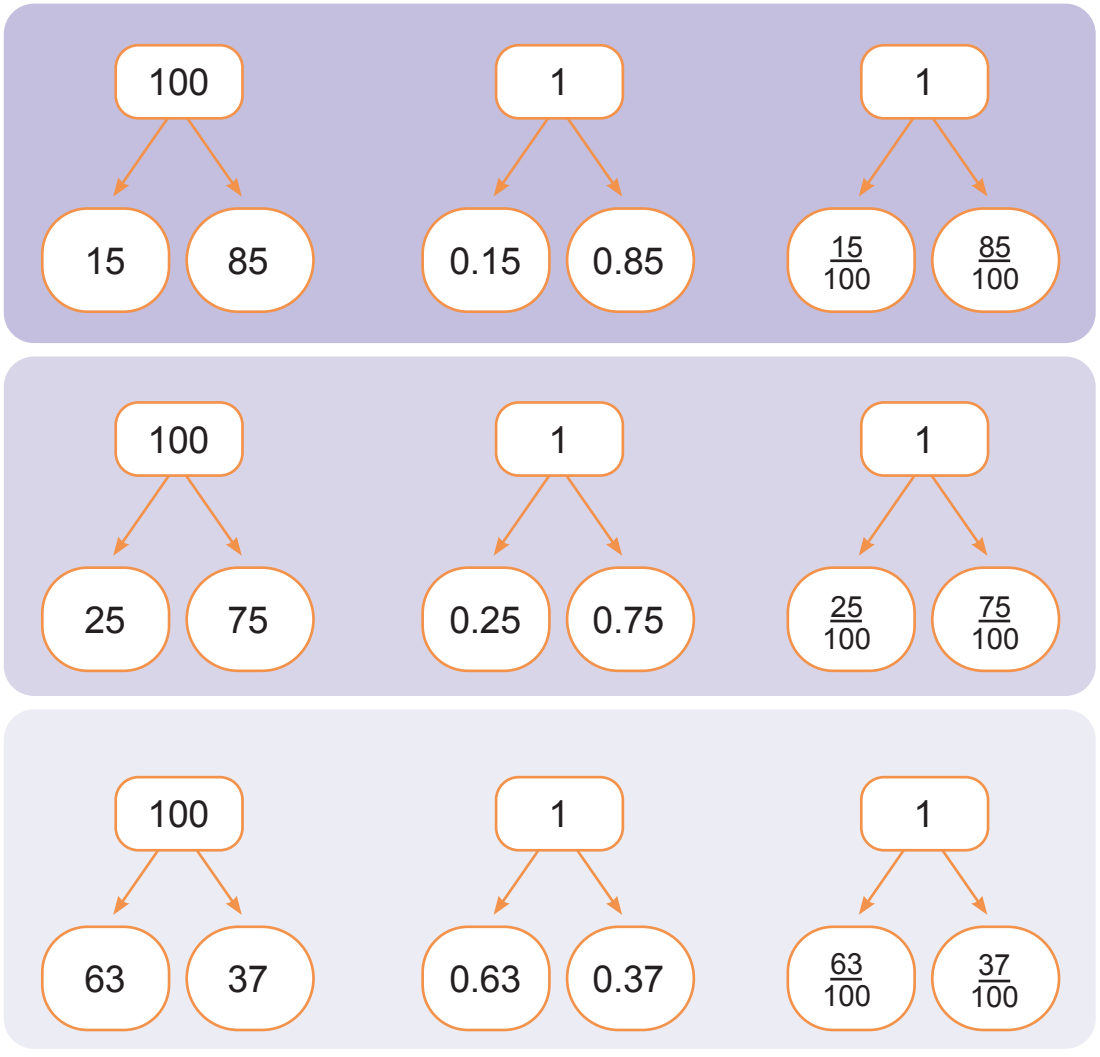
d)



e)



Decimal number bonds to 1



Let's investigate

Look at the part whole models. Investigate the patterns and recognize the patterns. Create 3 more such examples using number bonds of 100.

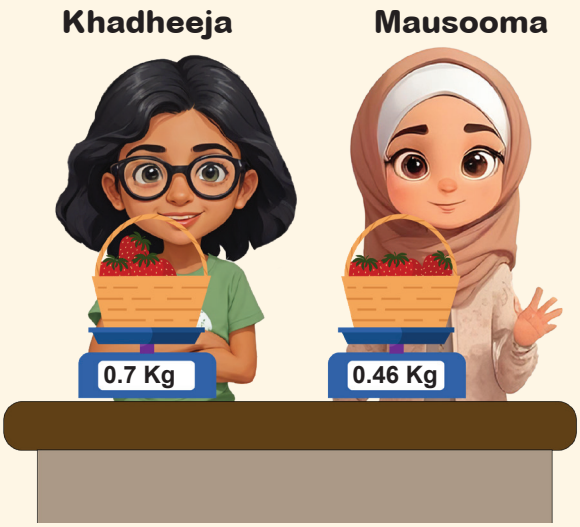
Example 1

Math in Real Life

Khadheeja and Mausooma both want to make strawberry jam.

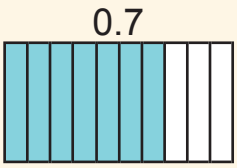
Strawberry jam recipe

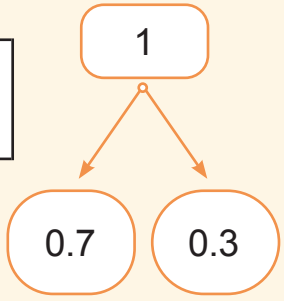
- 1 Kg strawberries
- $\frac{1}{2}$ Kg sugar
- 4 lemons

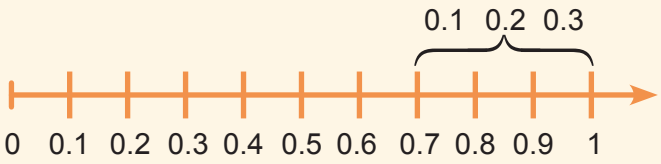


a) How many kilograms of strawberries does Khadheeja need to pick?

Khadheeja: 0.7 kg + ... = 1



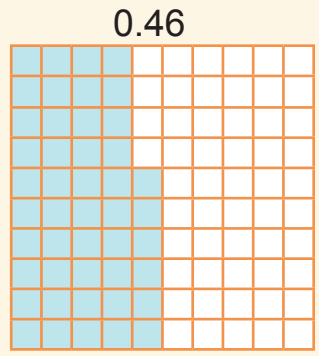


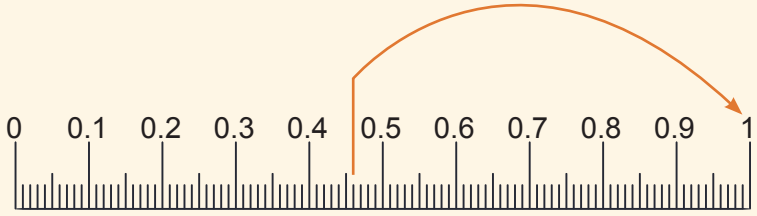


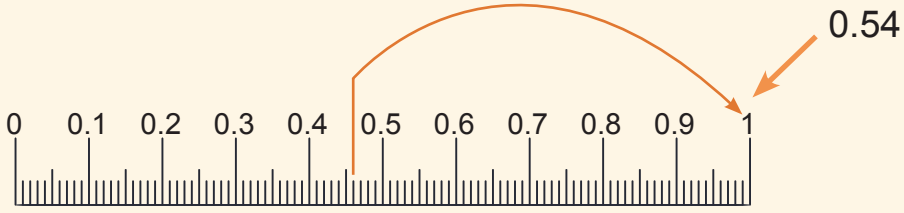
0.7 + 0.3 = 1, Khadheeja needs 0.3 kg of strawberries.

b) How many kilograms of strawberries does Mausooma need to pick?

Mausooma: 0.46 kg +.....= 1



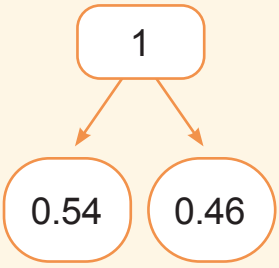




0.5 + 0.04 = 0.54

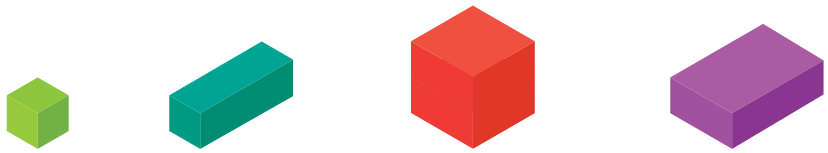
Mausooma needs 0.54 kg of strawberries.

0.4 + 0.6=1
0.54 + 0.46 = 1
4 + 6 = 10
54 + 46 = 100
540 + 460 = 1000



Exercise 4

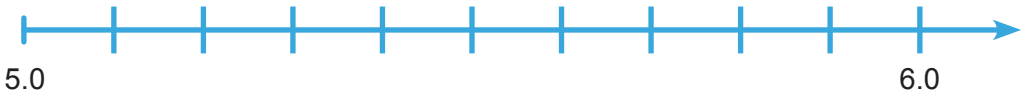
1 Arrange the following weights of parcels in ascending order.



3.48 kg 1.42 kg 10.65 kg 1.03 kg

2 Label the number line with the fractions.

$5\frac{1}{10}$ $5\frac{1}{2}$ $5\frac{73}{100}$



3 Here are some numbers in a place value chart.
Write the numbers in order, starting with the greatest.

Ones	Decimal point	Tenths	Hundredths
3	.	2	3
3	.	1	2
3	.	2	0
3	.	1	4

....

4 Match the decimals to the correct value of the underlined digit.

0.8<u>4</u>	4 ones
0.<u>4</u>8	4 hundredths
<u>4</u>8	4 tenths
8<u>4</u>.2	4 tens

5 Rewrite the following in decimals.

a) Hundred rufiyaa and fifty laari

.....

b) Two thousand rufiyaa and twenty five laari

.....

c) ~~9~~ and 90 laari.

.....

6 a) Draw arrows to show where each number belongs on the number line.

8 tenths | $\frac{30}{100}$ | 1.4

b) Arrange the numbers in descending order.

.....

Exercise 5

1 Saleem makes a number using decimal counters.

a) There are ..... tenths

b) There are ..... Hundredths

c) Saleem's number is .....

2 Make the number represented on each of the place value charts.

a)

Ones		Tenths	Hundredths
1 1 1	.	0.1 0.1	0.01 0.01 0.01 0.01 0.01

There are ..... ones,

..... tenths and

..... hundredths

The number is: .....

b)

Ones		Tenths	Hundredths
1 1 1	.		0.01 0.01 0.01 0.01 0.01 0.01 0.01

There are ..... ones,

..... tenths and

..... hundredths

The number is: .....

3 Fill in the zeros needed as placeholders for each number.

a)

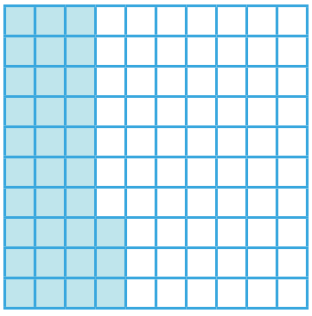
Tens	Ones		Tenths	Hundredths
3	2	.		4

b)

Tens	Ones		Tenths	Hundredths
		.	5	

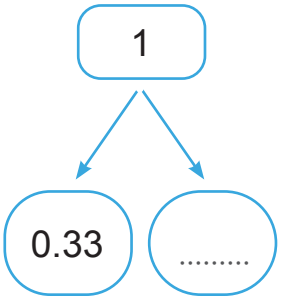
4 Use the following grids to complete the part whole models.

a)

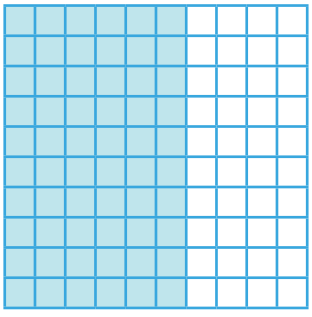


0.33

$\frac{33}{100}$

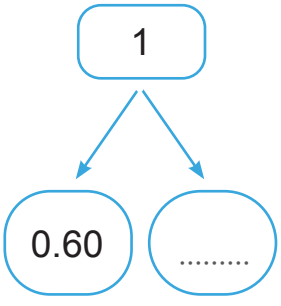


b)

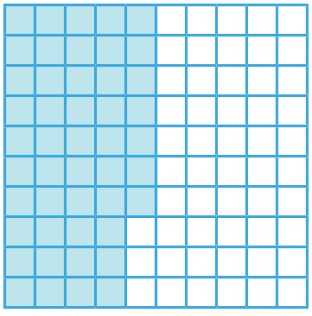


0.60

$\frac{60}{100}$

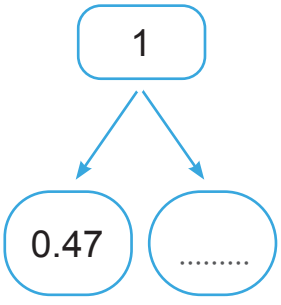


c)



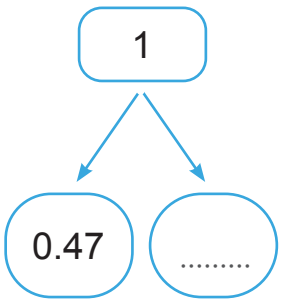
0.47

$\frac{47}{100}$

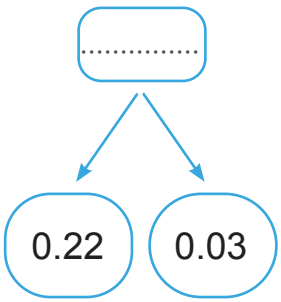


5 Complete the following part whole models.

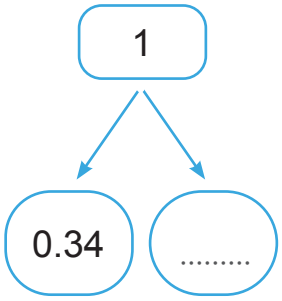
a)



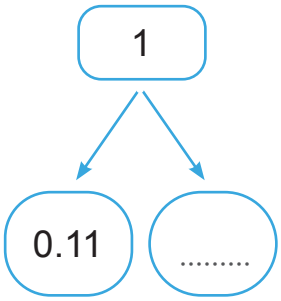
b)



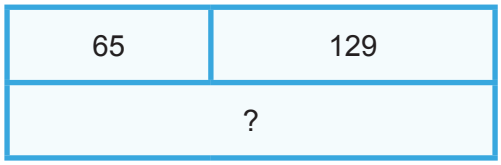
c)

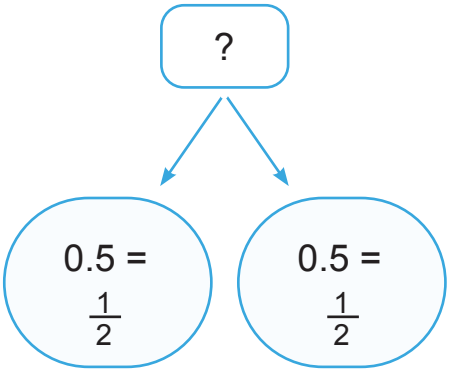


d)



5 Haleema went to the local market. She bought vegetables for ₹ 65.5 and fruits for ₹ 129.5.





Answer: ..... + ... = ...

5 What is the value of each set of coins? Fill in the place value charts. Give the answer in decimals and fractions.

a)

T	O		Tths	Hths
		.		

.....

.....

.....

.....

b)

T	O		Tths	Hths
		.		

.....

.....

.....

.....

c)

T	O		Tths	Hths
		.		

.....

.....

.....

.....

d)

T	O		Tths	Hths
		.		

.....

.....

.....

.....

Let's collaborate

Complete the decimal square to 1. Discuss the decimal square and identify the patterns in it.

Decimal Square
0.01 to 1

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
0.41	0.42	0.43	0.44	0.45	0.45	0.47	0.48	0.49	0.50
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60

Math Language

In the earlier unit, you have modelled terms related to fractions. What is the relationship between these words in fractions and decimals? For example, a quarter is $\frac{1}{4}$, what is a quarter in decimals? Discuss the following examples and present your findings.

A quarter/ one fourth/ one out of four	Half	One tenth	Five and half	One hundredth	One whole and a quarter
$\frac{1}{4}$					
0.25					

Put your thinking cap on

1 Saif identified a pattern in his calculations. Create a similar pattern using fractions of your choice.

$\frac{1}{2}$ of 80 = 40

÷ 2

$\frac{1}{4}$ of 80 = 20

÷ 2

$\frac{1}{8}$ of 80 = 10

2 Rayyan thinks you can only simplify even numbered fractions because you keep on halving the numerator and denominator until you get an odd number. Do you agree?

Share your thinking Explain your answer using examples.

a) Sort the fractions into the table.

Equivalent to $\frac{1}{2}$	Equivalent to $\frac{4}{10}$	Equivalent to $\frac{8}{10}$

$\frac{4}{20}$, $\frac{8}{20}$, $\frac{24}{30}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$

b) How do you find equivalent fractions? Share your method with friends.

c) Add TWO more fractions to each column.

d) Write the equivalent decimal for each fraction.

3 Rugiyya makes a pattern using tenths.

0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5,.....

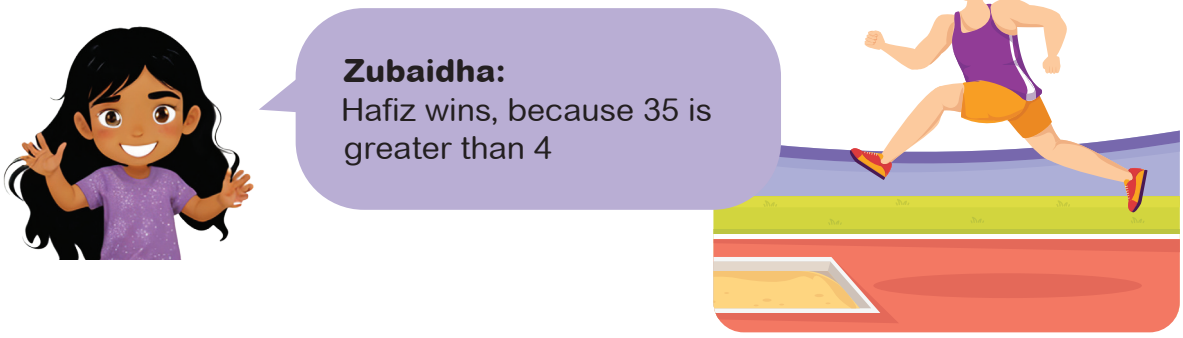
a) What is the rule Rugiyya used to create the pattern?
b) Complete the following patterns.

i) 0.3, 1.3, ……,……,……,……,……,……

ii) 0.5, 1.0, 1.5, ……,……,……,……,……

iii) 10.1, 20.1, 30.1, ……, ……,……,……,……

4 Hafiz and Ameera are competing in a long jump. Hafiz jumps 1.35 metres and Ameera jumps 1.4 metres



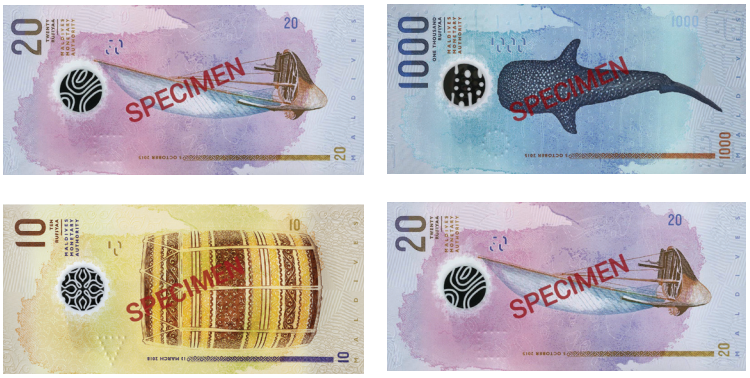
a) Is Zubaidha correct? Discuss with your friends.
b) Zubaidha joins the competition. What is the shortest distance she can jump to go into the lead?

5 Saif has ৳ 5. Asiya has ৳ 100.

a) How many 1 laari are in ৳ 5?
b) How many 1 laari are in ৳ 500?

6 Haneef wants to buy a mixed nuts packet and a cashew nuts packet.
The price of a 0.6 kg of mixed nuts packet is ﷼ 45.
The price of a 0.4 kg cashew nuts packet is ﷼ 39.

a) Find the total price of 2 packets.
b) Find the total weight of 2 packets.
c) Give the total weight of 2 packets in grams.
d) Haneef has the following notes and coins in his wallet. Help him choose the most suitable combination of notes and coins to pay for the nuts packets.

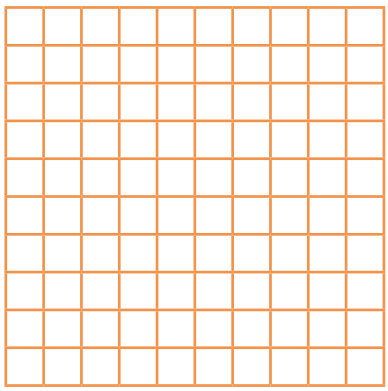


Self assessment

1 Complete the following place value chart.

Number	Thousands	Hundreds	Tens	Ones	.	Tenths	Hundredths
4235.01							
280.63							
0.06							
500							

2 Shade thirteen hundredths of the following grid.



3 Complete the following sequences.

a) 0.2, 0.4,……,……,……,……

b) 0.02, 0.04,……,……,……,……

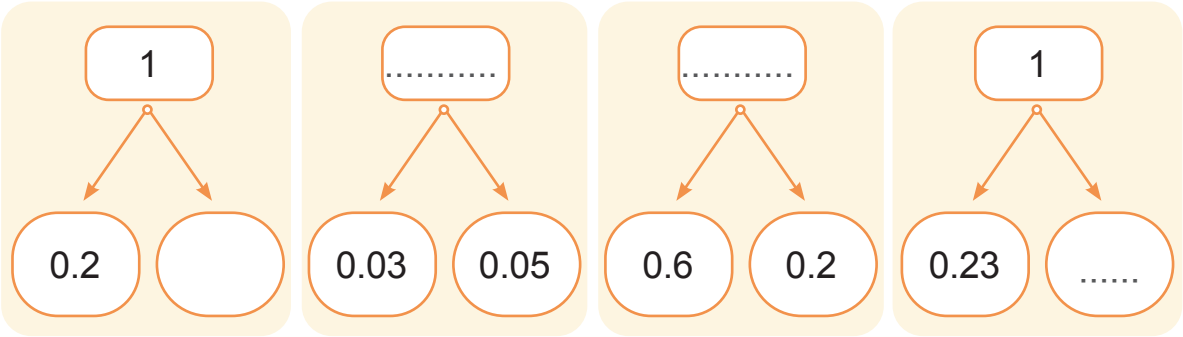
c) 2, 4,……,……,……,……,……

d) 20, 40, ……,……,……,……

e) 200, 400,……,……,……,……

f) 2,000, 4,000……,……,……,……

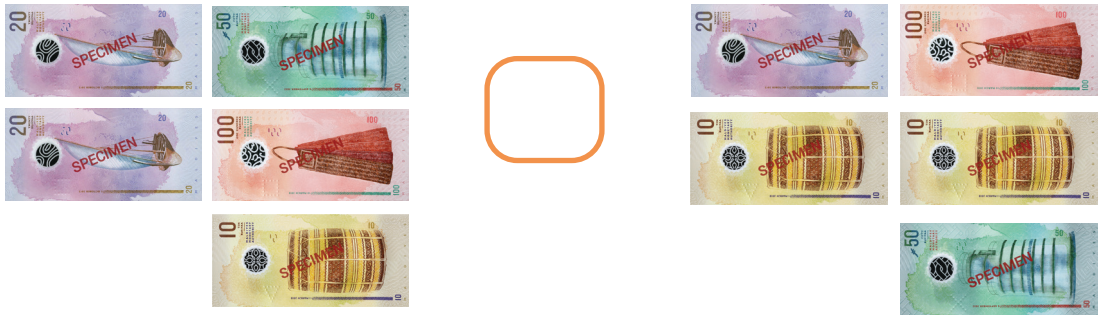
4 Complete the following part whole models.



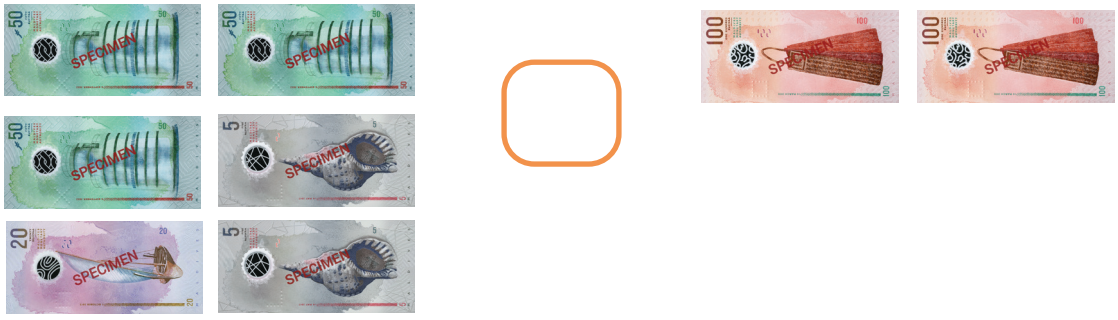
5 Compare and write < , =, >.

a)

b)



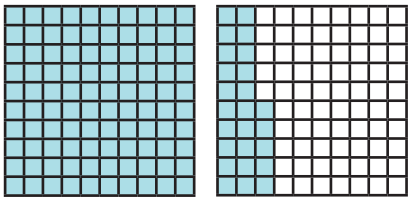
c)



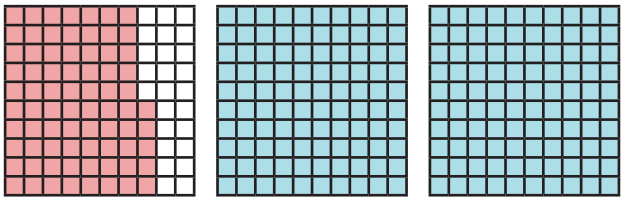
d)

6 Write equivalent fractions for the following decimals.

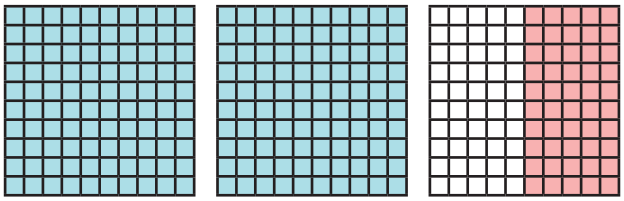
a) 1.25 .....



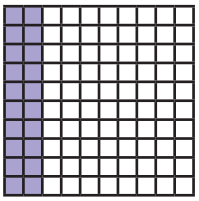
b) 2.75 .....



c) 2.5 .....



d) 0.2 .....



7 Shafeega partitions 0.34.

0.34	
0.3	0.04

Use shafeega's example to partition 0.54.

Let's reflect

In this unit, I learned……..…….

I will use these skills in real life situations such as ……..….

New strategies I learned are……..

New words I learned are ……...

The exercise/activity that helped me to learn the most is…….

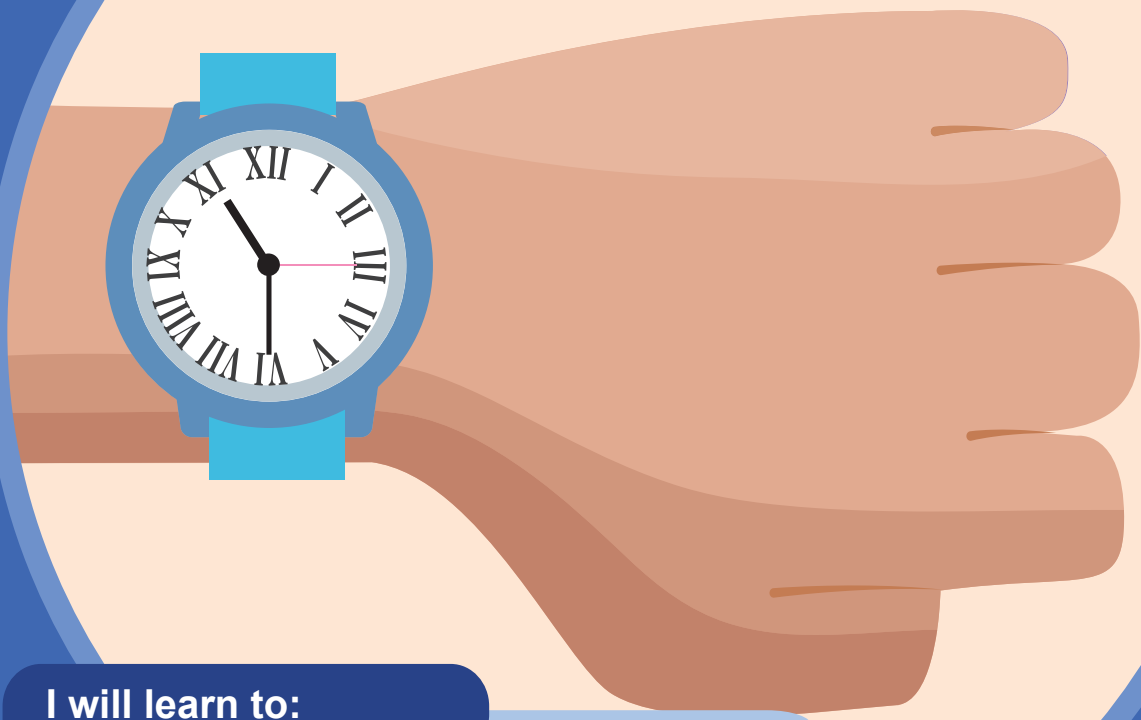
I am good at …….

The mistakes I did are……..……..

What I learned from my mistakes are..... …….

Unit 9

Other Numerals



I will learn to:

- Use Arabic indic numerals up to 30.
- Use Roman numerals up to 12.

Warm up

Math mindset

What can I do if I'm stuck?

- I can use a different representation.
- I can use a different strategy.
- I can figure out how my friends did it, seek their help and try again, because Math is PERSEVERANCE.

Let's investigate

Discuss the Hijri calendar for this year. Do you notice a different type of number? What do you think about these numbers? Where else do you see these numbers, aside from in Hijri calendars?

February 2024 رَجَب - شَعْبَان ١٤٤٥

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 ٢١	2 ٢٢	3 ٢٣
4 ٢٤	5 ٢٥	6 ٢٦	7 ٢٧ Isra' and Mi'raj	8 ٢٨	9 ٢٩	10 ٣٠
11 شعبان Martyr's Day	12 ٢	13 ٣	14 ٤	15 ٥	16 ٦	17 ٧
18 ٨	19 ٩	20 ١٠	21 ١١ International Mother Language Day	22 ١٢	23 ١٣	24 ١٤
25 ١٥	26 ١٦	27 ١٧ National History Day	28 ١٨	29 ١٩		

Arabic Indic numerals

Let's learn Arabic Indic numerals in 10s.

1 - 10

European	0	1	2	3	4	5	6	7	8	9
Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩

Let's collaborate

Discuss and complete the following tables in groups. Use the above table to write the Arabic Indic numerals from

11 - 20

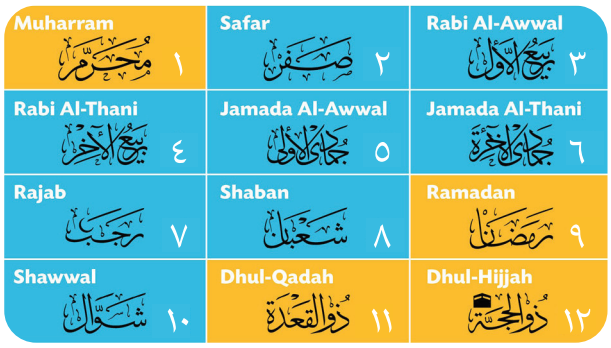
Number	11	12	13	14	15	16	17	18	19	20
Corresponding Arabic Indic numerals										

21 - 30

Number	21	22	23	24	25	26	27	28	29	30
Corresponding Arabic Indic numerals										

Exercise 1

Math in Real Life



1 Use the Hijri calendar of this year to answer the following questions.

a) How many months are there in a year?

.....

b) How many days are there in the month Shawwal?

.....

c) Write the date of the following.

i) Islamic New Year .....

ii) National Day .....

iii) Beginning of Ramazan .....

iv) Fitr Eid day .....

v) Hajj day .....

vi) Al'h'aa Eid .....

vii) The day Maldives embraced Islam .....

2 Complete the following number track

Arabic Indic numerals										
Corresponding number	11				15					20

Math Language

Make Arabic Indic numeral cards from 1 to 30.

Put the cards in a bowl and pick a card. Write the corresponding number on the board. Take turns till the class completes all the 30 numbers.
Discuss the numbers that are difficult for you to remember among Arabic Indic numerals. Brain storm different methods you can use to remember those numbers.

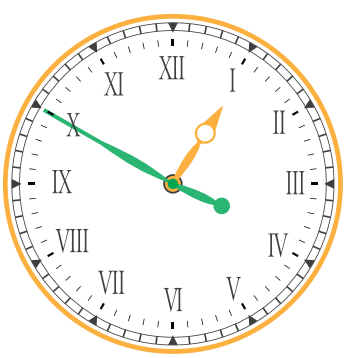
Let's investigate

Use Mathematics books, internet and other resources to find the following information and present it to your class.

- Invention of Arabic Indic numerals.
- The situations where we use Arabic Indic numerals in day-to-day life.

Roman Numerals

Roman numerals are a number system that was invented by the ancient Romans for the purpose of counting and performing day-to-day transactions.



It is thought that the Romans started using these numbers because they figured that once a number reaches 10, it becomes very hard to count using fingers.

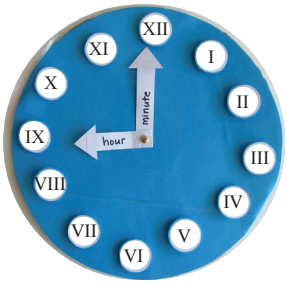
Roman numerals are used by combining letters together.

For example, in Roman numerals, four is written as IV.
I = 1 and V = 5. Therefore, IV indicates five minus one.
Similarly, another example is the number nine. It is written as IX.
X = 10 and I = 1, so IX represents ten minus one.

Let's collaborate

Look at the Roman numerals up to 10 and discuss how it is used by combination of letters. Eg: 8 = VIII = 5+1+1+1

In pairs, make a clock as shown. Take turns, change the time and ask your partner to say the time. Give 5 points for each correct answer and subtract 5 points from the total score for each incorrect answer.



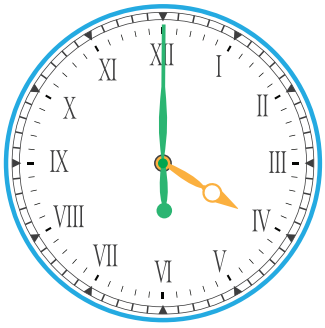
Exercise 1

1 Match the numbers to the Roman numerals.

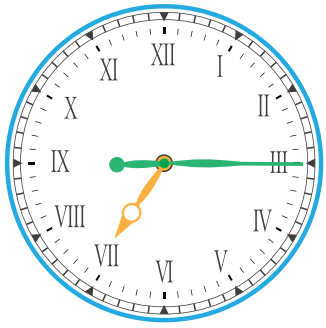
2 Complete the table.

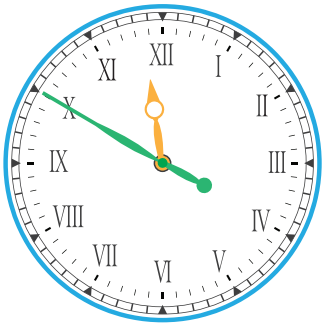
Number	Roman Numeral
1	I
2	
3	
4	IV
5	V
6	
7	
8	VIII
9	
10	X
11	XI
12	

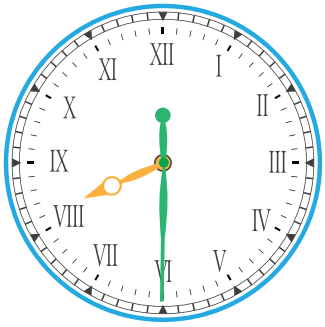
3 Write the time in words.

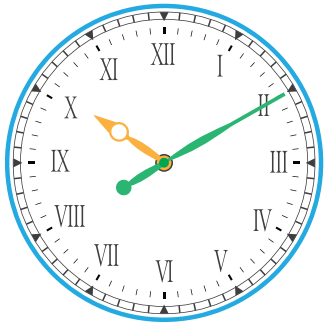


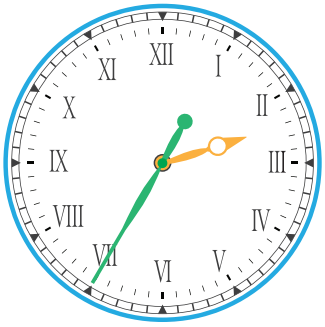
Four o'clock





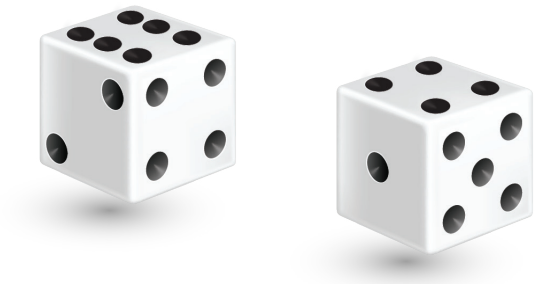






Put your thinking cap on

1 Wafira rolled a 6-sided dice twice.



a) Look at the 2 dices. What is Wafira's score?

.....

b) Write the score in Roman numerals.

.....

c) Nazima rolled the same dice twice and gets two **different numbers**. Her score is the same score as Wafira's. What numbers could Nazima have rolled?

.....

d) Write Nazima's score in Arabic Indic numerals.

.....

2

XII > ٣٥

True False

Explain your answer. .....

.....

.....

3 Fayaz writes patterns using Roman and Arabic Indic numerals. Find the rule and extend the pattern.

a) II, IV, VI, ……..,……..,…….

b) ٠, ٥, ١٠, ١٥, ……..,……..,……..,…….

4 Create a pattern of your choice using Arabic Indic numerals.

.....

.....

Share your thinking

Explain the rule of your pattern.

Self assessment

1 Complete the following place value chart.

Number	Roman numerals	Arabic Indic numerals	Number name in words/English	Number name in Dhivehi
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

1 Give the following dates in Arabic Indic numerals.

i) 05 Rajab 1445 .....

ii) 27 Ramazan 1430 .....

iii) 10 Hajj 1426 .....

iv) 08 Shawwal 1419 .....

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

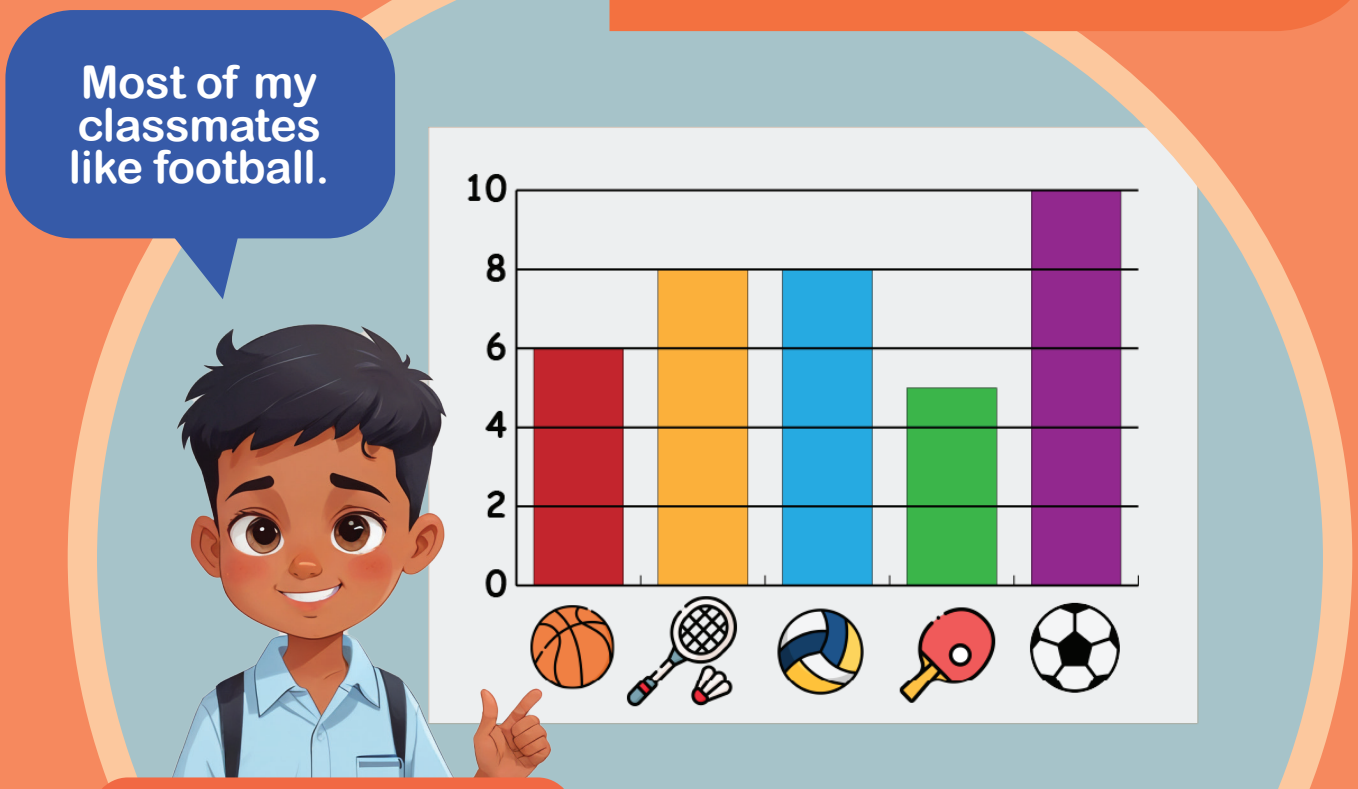
I am good at ……

The mistakes I did are ……..

What I learned from my mistakes are ……

Unit 10

Handling data



I will learn to:

- Collect data.
- Organize and display data in tables, bar graphs and line graphs.
- Interpret line graphs.

Math mindset

I celebrate my Math mind, because I strive to learn something new and try moving forward in Math class every day.

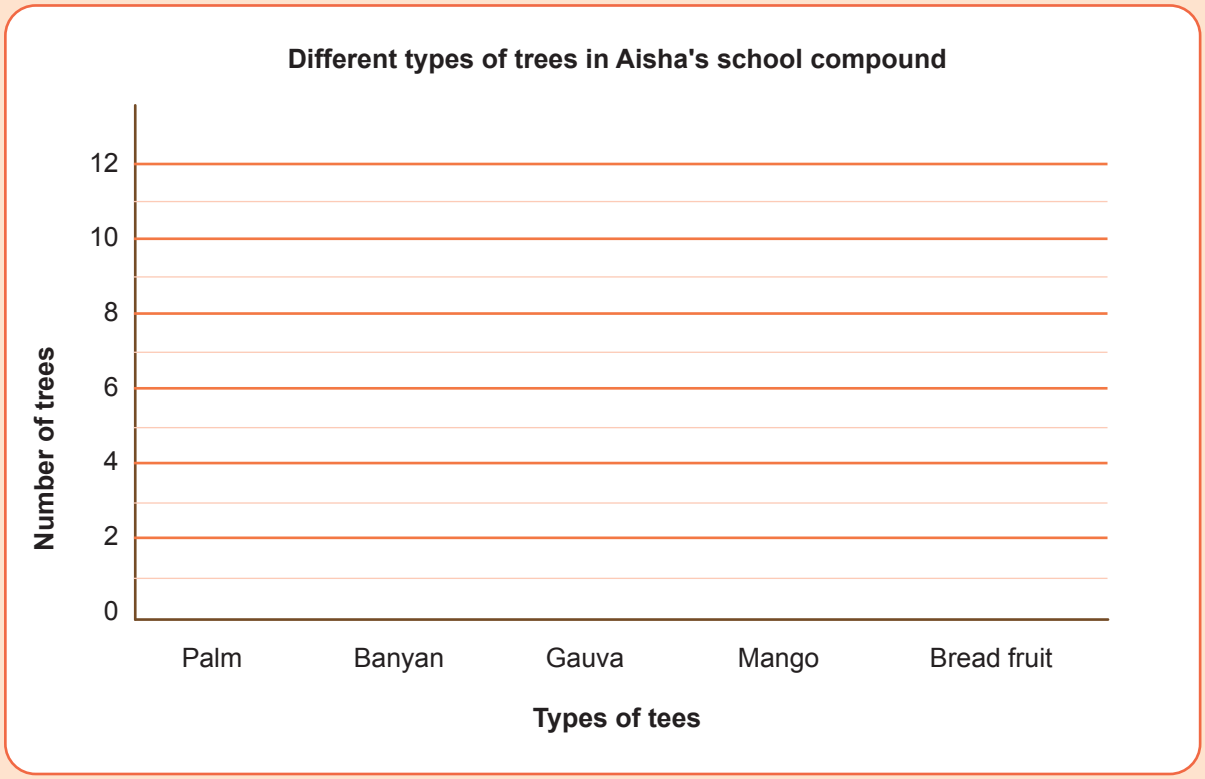
Warm up

1 Aisha collected data on the different types of trees in her school compound.

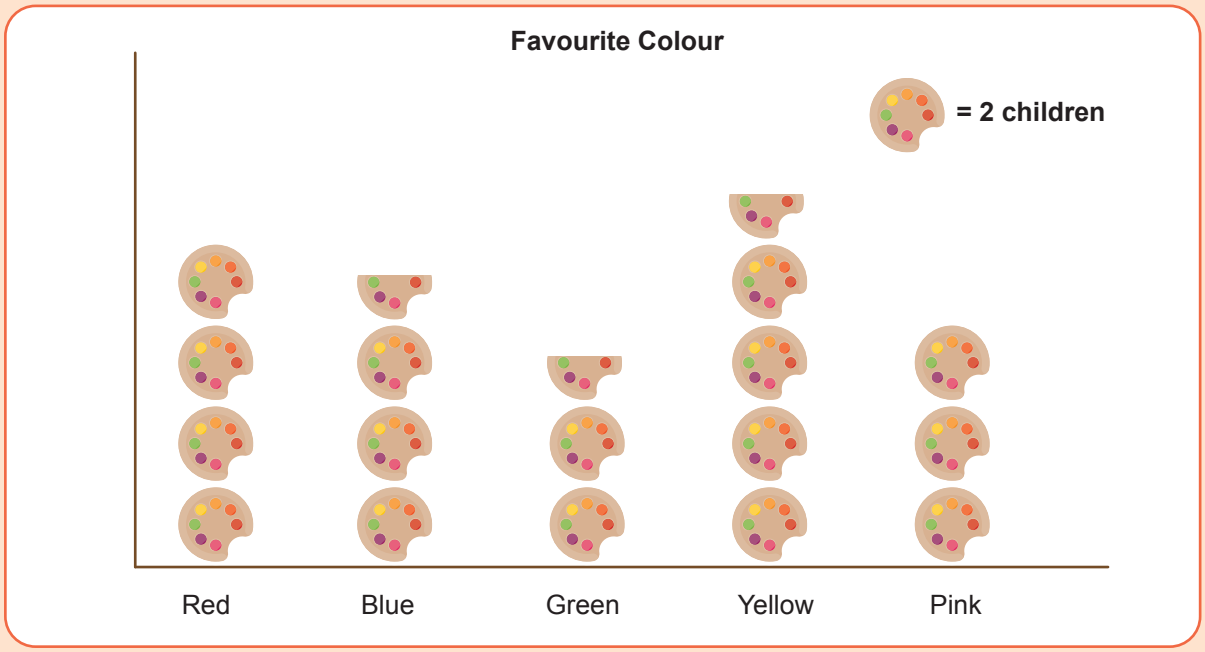
a) Help her complete the table.

Types of tree	Tally marks	Number of trees
Palm tree	𝍸 𝍸	
Banyan tree	𝍸 𝍸 |	
Gauva tree	𝍸 ||||	
Mango tree	𝍸	
Bread fruit tree	|||	

b) Draw a bar chart to represent the data.



2 The pictograph shows favourite colours of a group of students. Use the pictograph to answer the following questions.



a) Which is the least favourite colour?

.....

b) How many children chose yellow as their favourite colour?

.....

c) How many fewer children chose green than blue as their favourite colour?

.....

d) How many children chose pink and red as their favourite colours?

.....

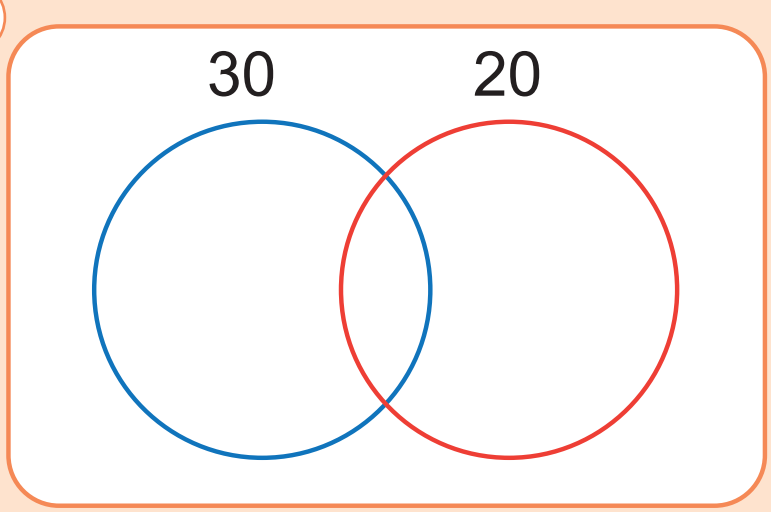
3 Represent the information on the Venn diagram.

Factors of 30

30 = 2 x 3 x 5

20 = 2 x 2 x 5

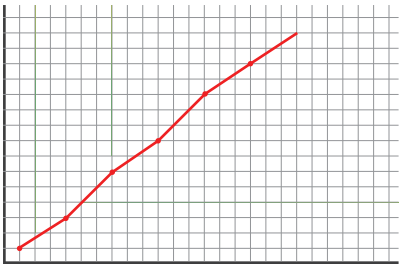
Factors of 20



Line graphs

We use line graphs to show changes over time.

- An upward line indicates increasing values.
- A downward line indicates decreasing values.

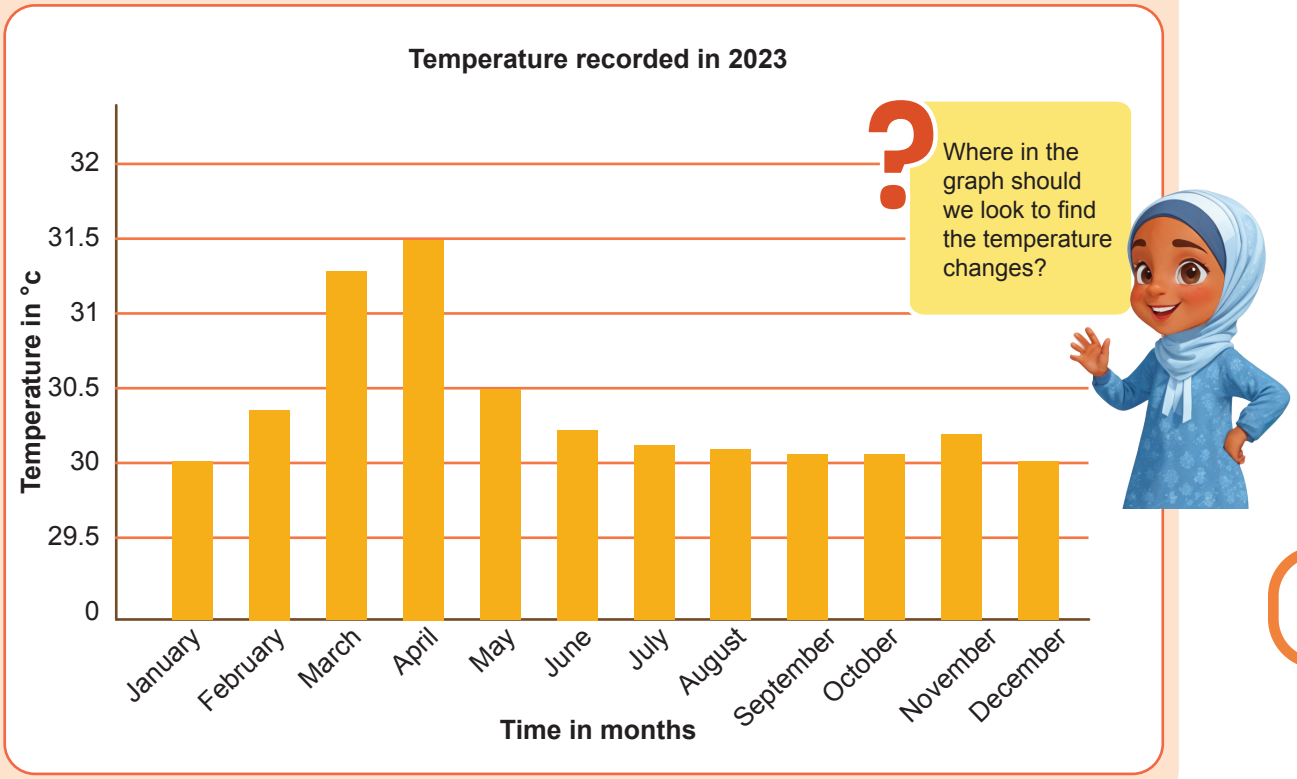


Now, let's explore the difference between bar graphs and line graphs, as well as the situations in which line graphs are appropriate to use.

Example 1

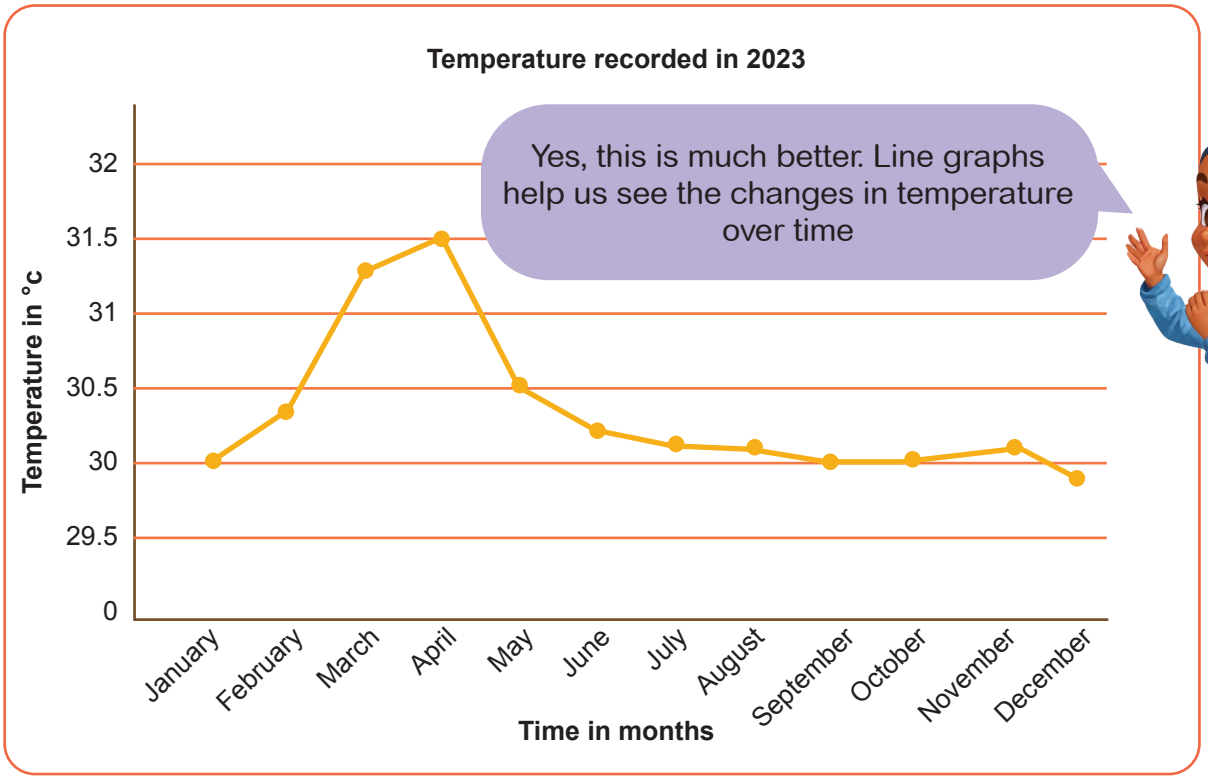
The bar graph shows the temperature of each month in a city.

Looking at the graph, explain the temperature changes from January to December



Let's think about how to represent changes in temperature for easier understanding. Let's draw a line graph.

The tops of the bars are connected with lines to make the line graph.



Yes, this is much better. Line graphs help us see the changes in temperature over time

We use line graphs to display information which changes over time.

Example 2

A shop selling savoury packs has a sale. When the shop opens at 9 a.m., they have 58 savoury packs.

The shopkeeper checks how many savoury packs are left every 2 hours.

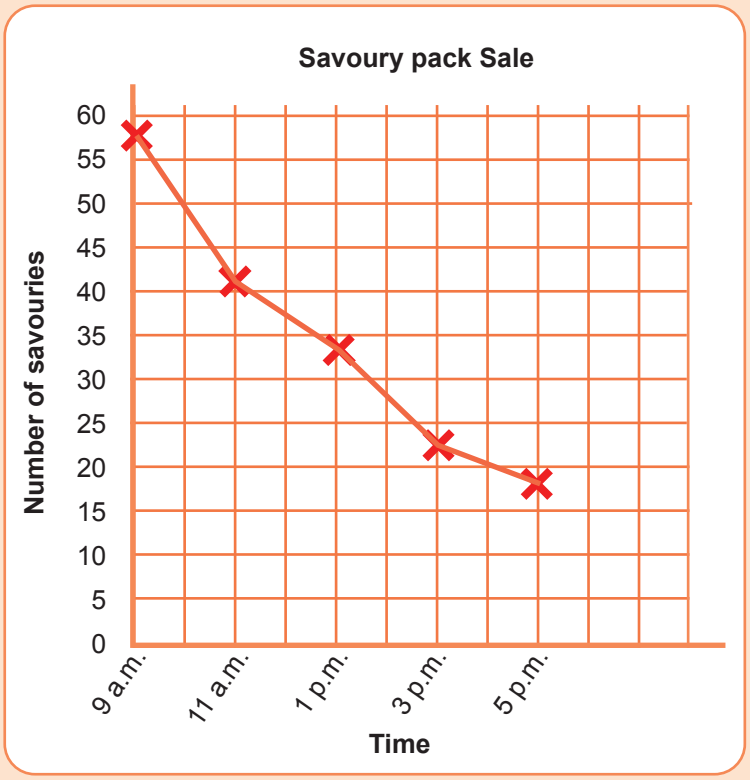
Time	9 a.m.	11 a.m.	1 p.m.	3 p.m.	5 p.m.
Savoury packs	58	42	34	21	17

The data is recorded on a line graph.

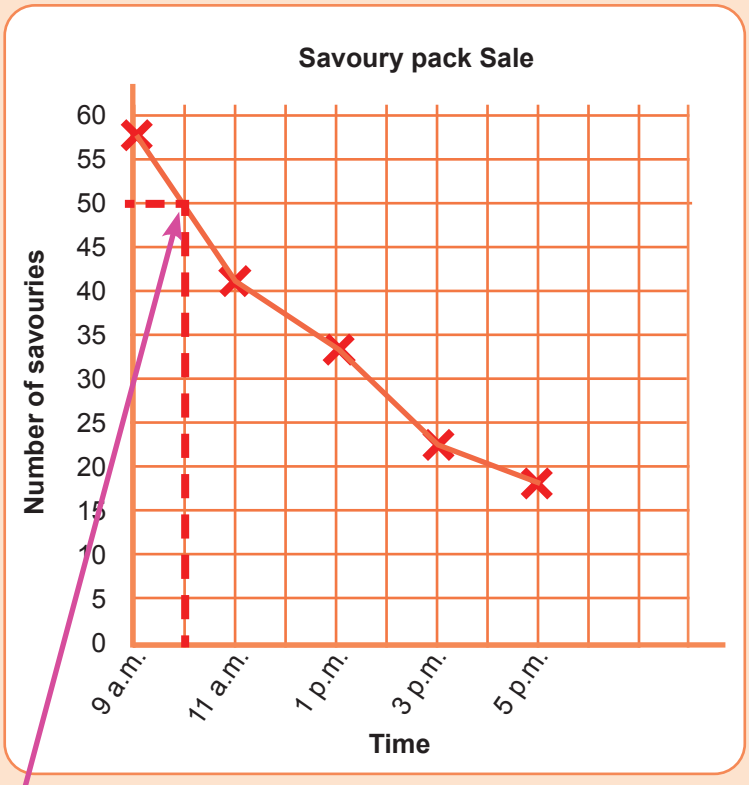
The horizontal axis shows the time.

The vertical axis shows the number of savouries.

In this graph, 1 square represents 5 savouries.



I can estimate the number of savouries left at 10 a.m.

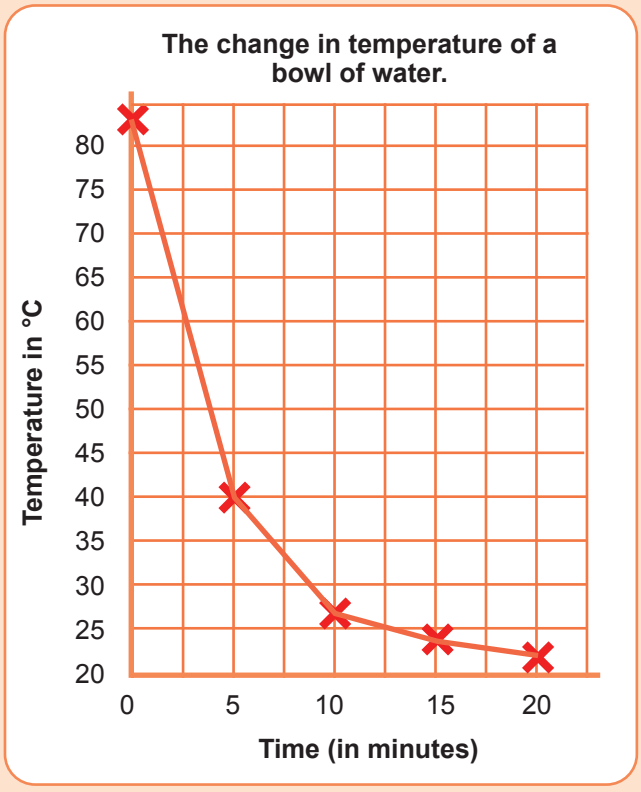


Approximately 50 savouries were left at 10 a.m.

Example 3

This table shows the temperature of a bowl of water over a period of 20 minutes.

Time in minutes	0	5	10	15	20
Temperature in °C	84	40	27	23	21



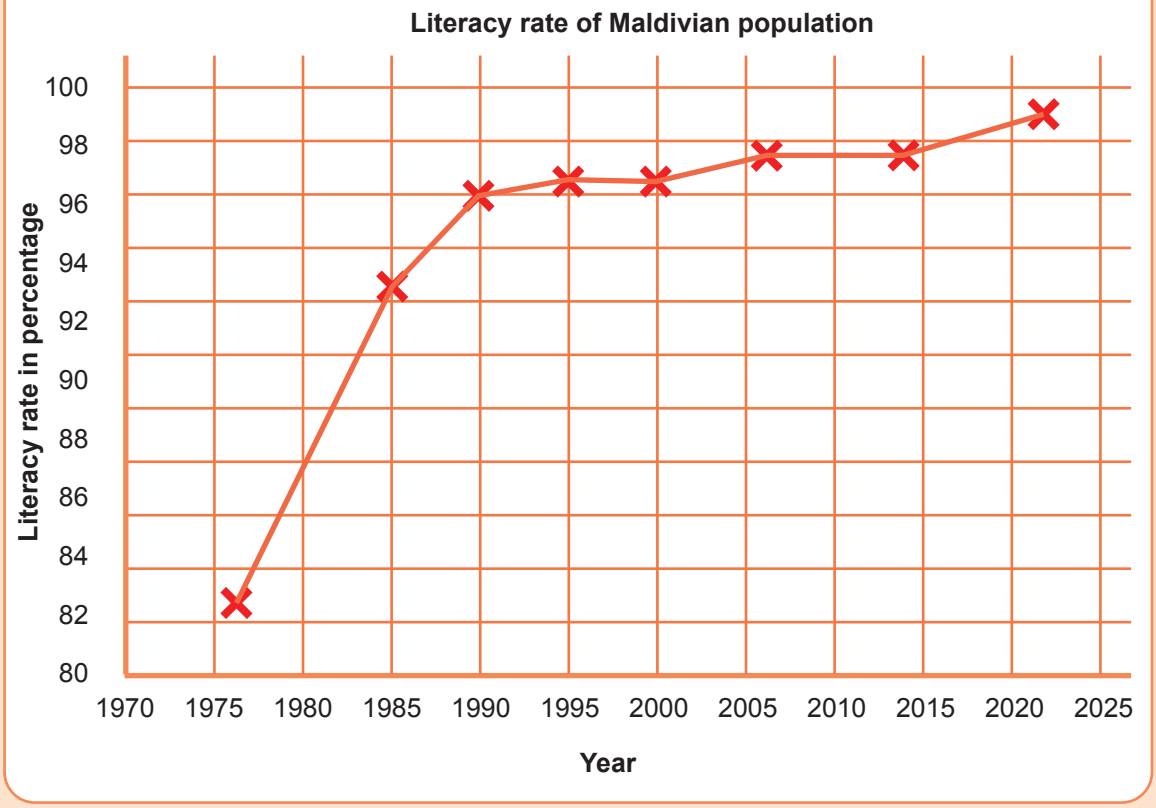
When did the water cool the quickest?

How do we find it?

The line between 0 and 5 minutes is the steepest. Therefore, water cooled quickest from 0 to 5 minutes.

Example 4

The graph shows the literacy rate of the Resident Maldivian Population from 1977 to 2022; Mother tongue Dhivehi.



a) What was the literacy rate in 2000?
96.3%.

b) Which year had the least literacy rate?
1977

c) Can you accurately read the literacy rate in 1980? Why?
No. Because, literacy rate was not recorded in 1980.

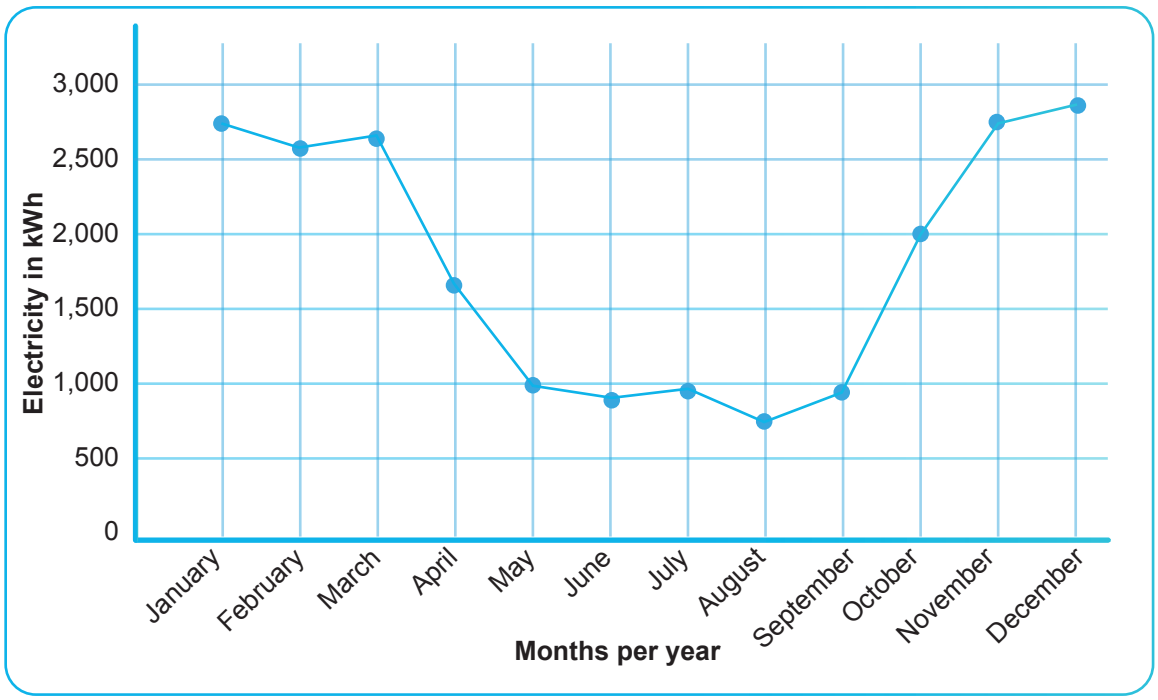
d) Describe what you notice about Maldives literacy rate.
Since 1977, the upward line shows that the literacy rate increased rapidly and since 1990, the literacy rate remains steady.

Math Language

We read this as "Ninety-six-point 3 percent". Percent means 'out of 100' and is denoted by the symbol %.

Exercise 1

1 Electricity is measured in kWh (kilowatt hours). This graph shows the amount of electricity used in a year in a household.



a) When was the use of electricity the highest?

.....

b) When was the use of electricity the least?

.....

c) In October, how much more electricity was used than May?

.....

d) Compare and describe the usage of electricity at the beginning, middle and end of the year.

.....

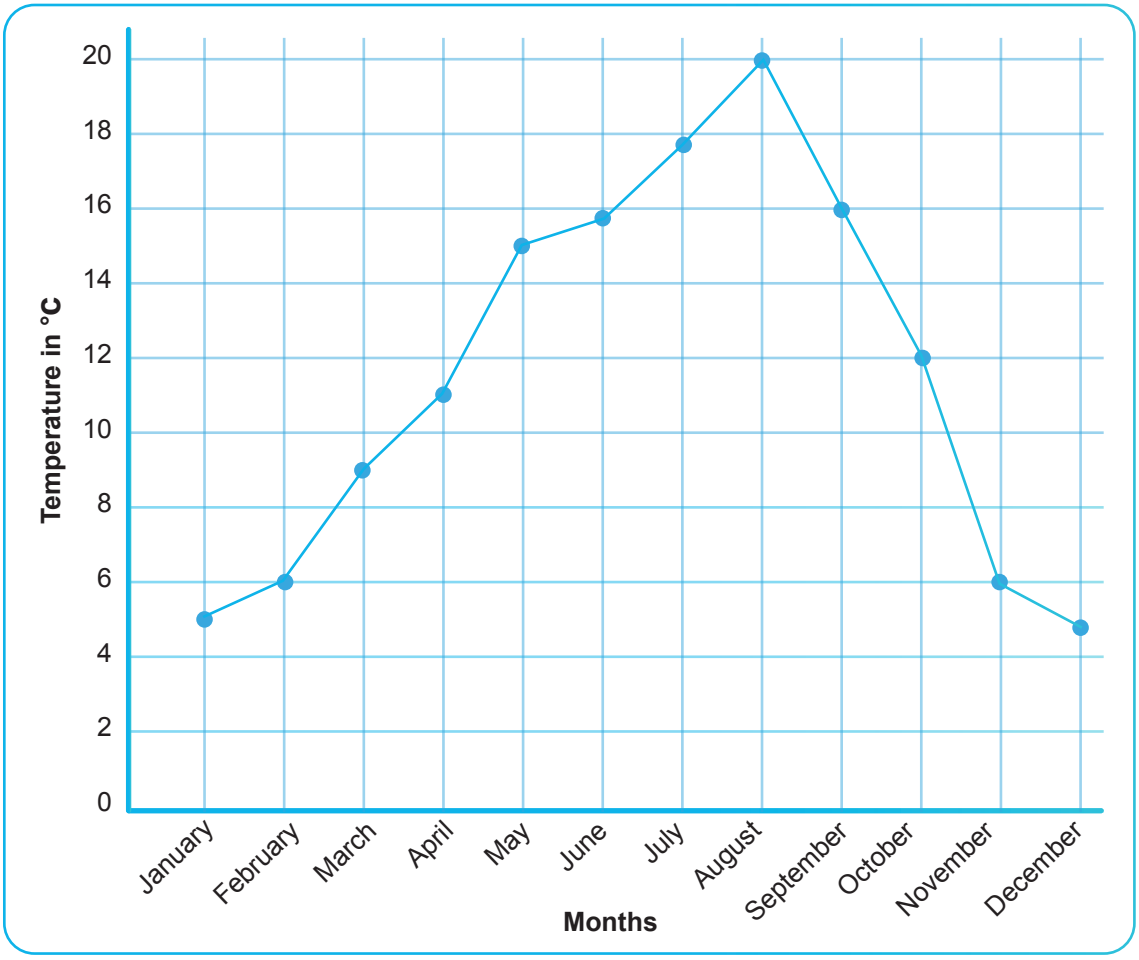
.....

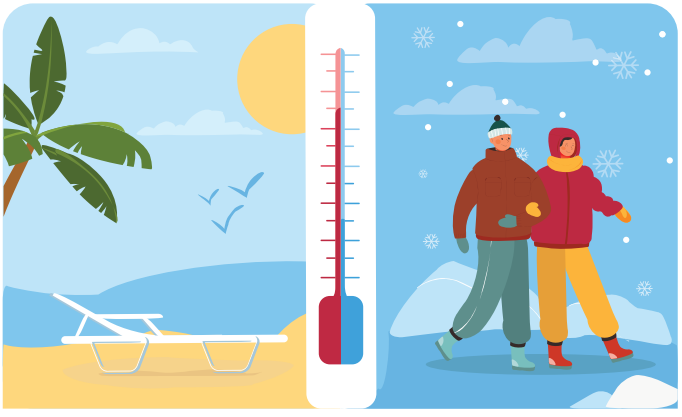
.....

Let's collaborate

What can we do to reduce the use of electricity? Discuss in groups and share your ideas.

2 The graph below shows temperature of a city from January to December.





a) What is the temperature in April?

.....

b) What is the hottest month?

.....

c) Which months are coldest?

.....

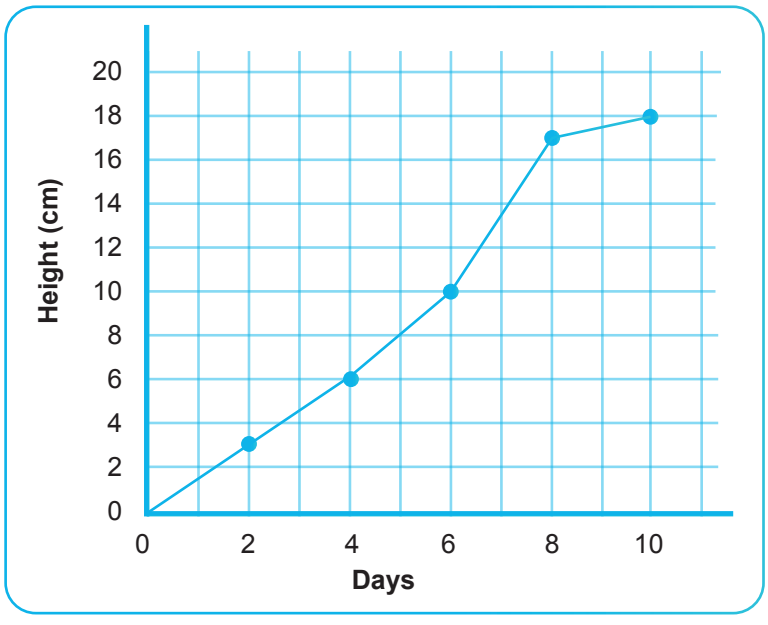
d) Find the difference between the temperature of hottest and coldest month?

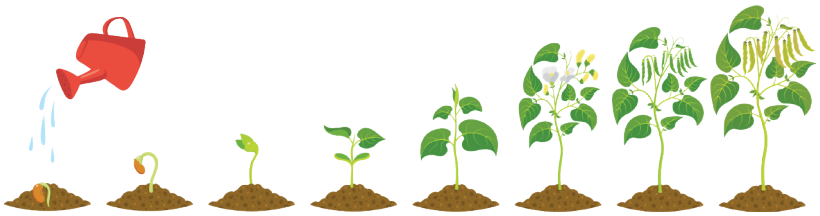
.....

.....

.....

3 The line graph shows the growth of a bean plant over 10 days.





a) How tall was the bean plant on day 2?

.....

b) Between which two days did the bean plant grow the most?

.....

c) On what day did the bean plant reach 6 cm?

.....

d) What is the difference in height between the start and end of recording?

.....

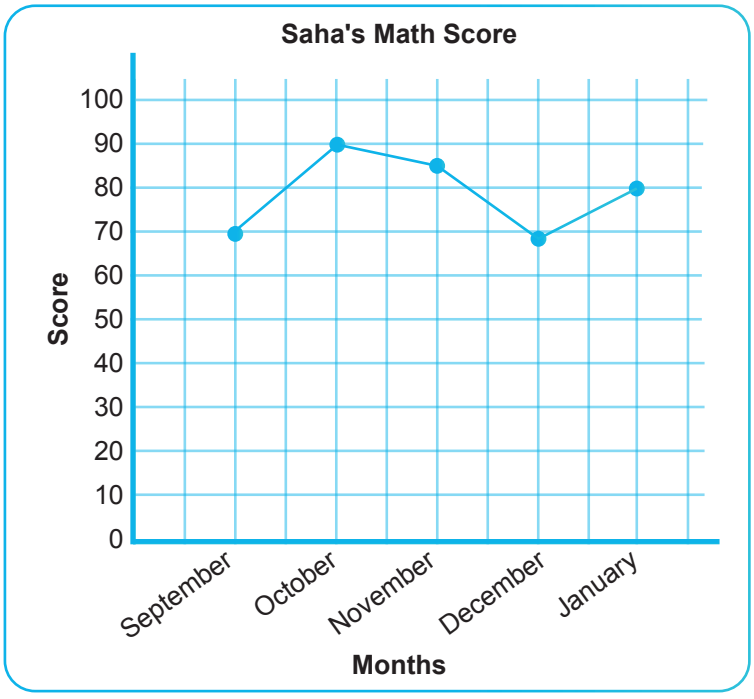
e) Estimate the height of the bean plant on day 5.

.....

f) Estimate when the bean plant will reach a height of 14cm.

.....

4 Saha recorded the scores of her Math unit tests. The following line graph represents the data.



a) Use the line graph to complete the table.

Month		October			
Math Score		90			

b) Following is the grading scale of Saha's school.
How many times Saha achieved A grades in Maths from September to January?

A	90 to 100
B	80 to 89
C	70 to 79
D	60 to 69
F	less than 59

.....

c) What was Saha's lowest score?

.....

d) When was Saha's highest score?

.....

e) What is the difference between highest and lowest scores?

.....

f) Describe Saha's Math performace using the line graph and grading scale.

.....

.....

.....

.....

.....

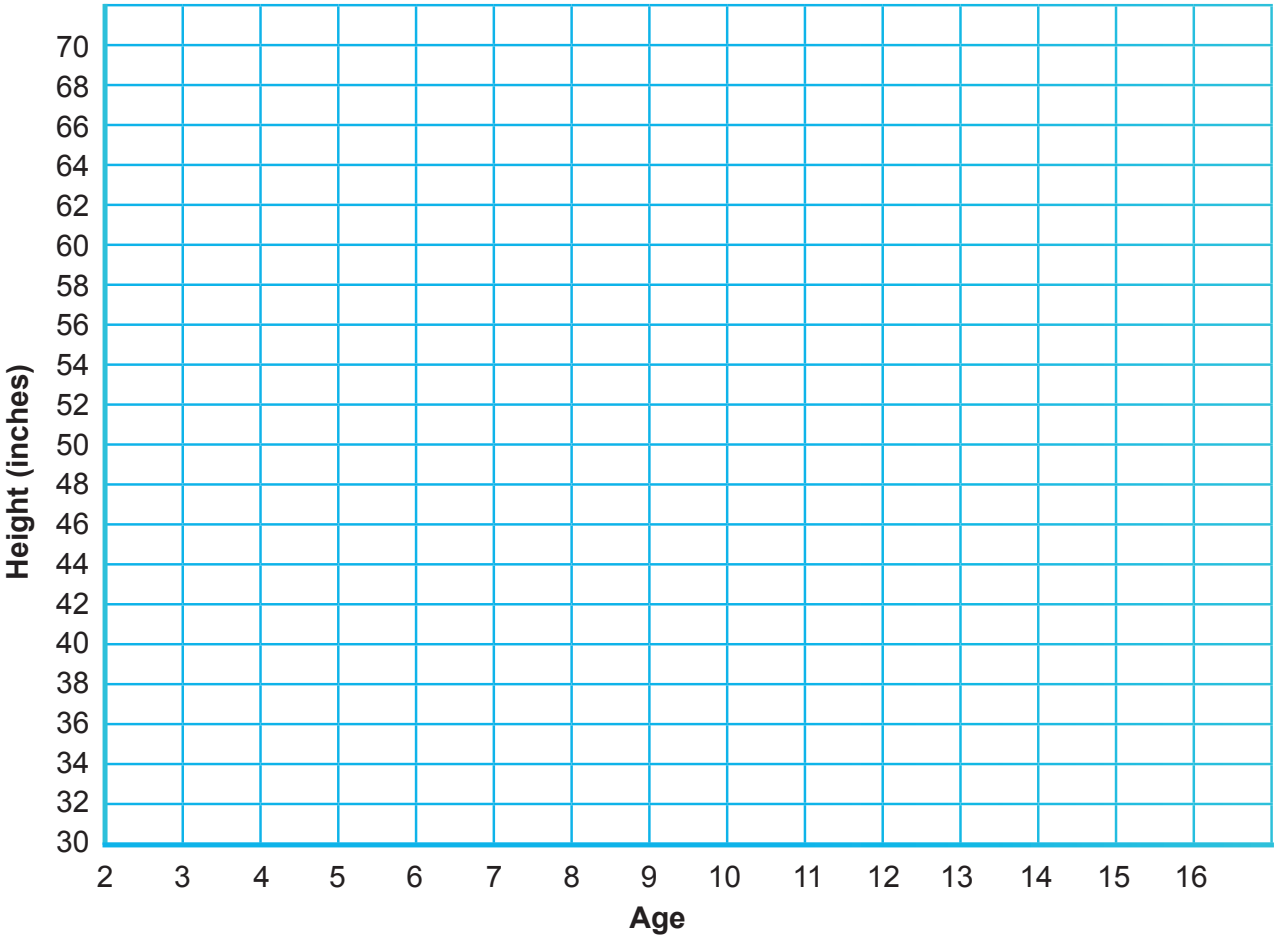
.....

.....

Exercise 2

1 The table below shows the records of Ahmed's height.

Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Height (in)	34	37	40	42	44	46	50	54	57	61	63	64	65	66	67



a) Use the data in the table to plot a line graph of Ahmed's height.

b) At what age did Ahmed's height pass 5 foot (60 inches)?

.....

c) What is the difference in Ahmed's height between age 2 and 16?

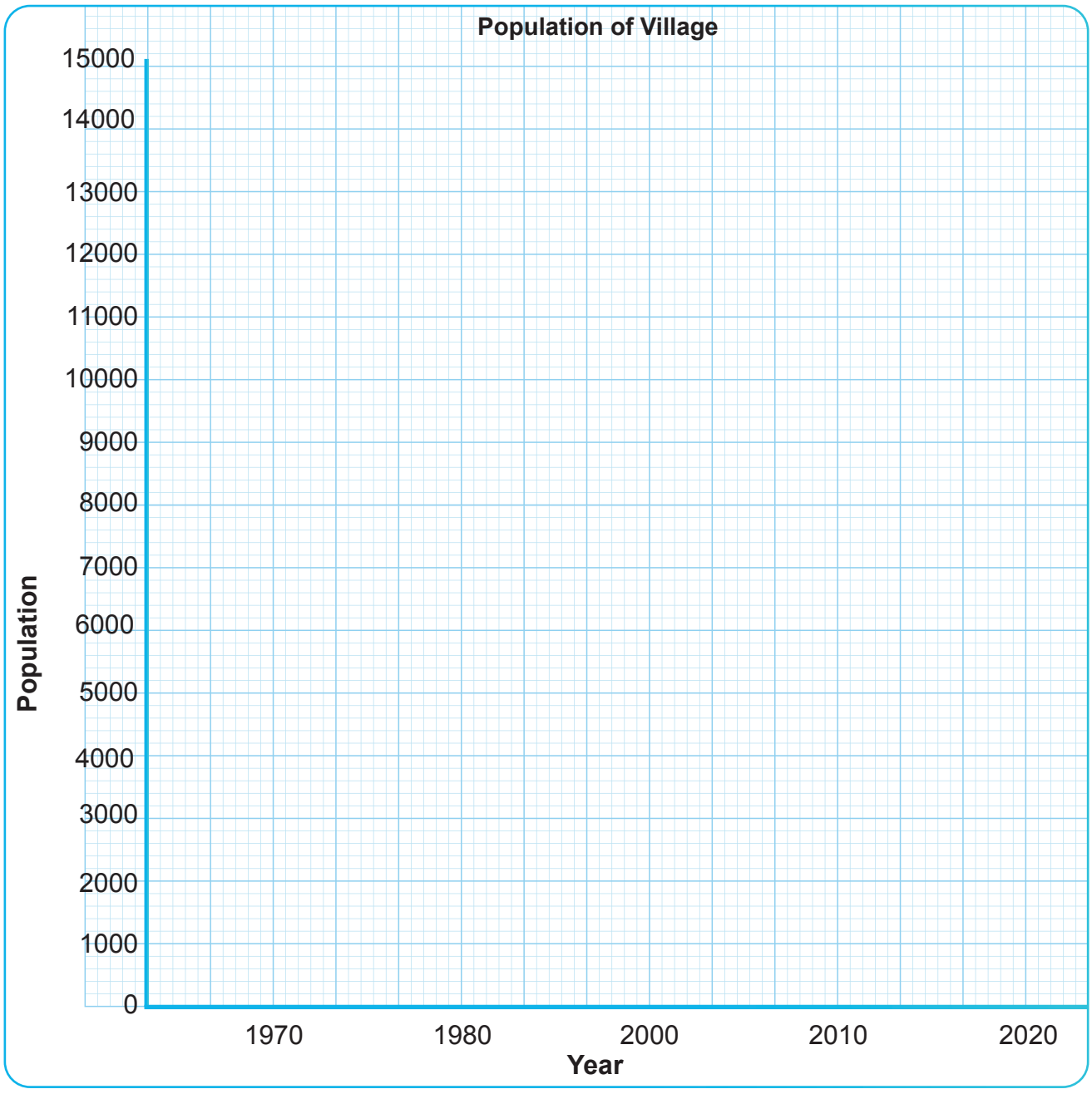
.....

d) During which specific year did Ahmed experience the most significant growth?

.....

2 The population of a small village is recorded every 10 years.

Year	1970	1980	1990	2000	2010	2020
Population (in thousand)	3	5	7	10	12	15



a) Draw a line graph to show the above data.
b) What was the population at the end of 1970?

.....

c) Can you accurately tell the population in 1991? Why?

.....

d) Which decade had the least population increase?

.....

e) Predict the population at the end of 2030. Compare your answers with a partner.

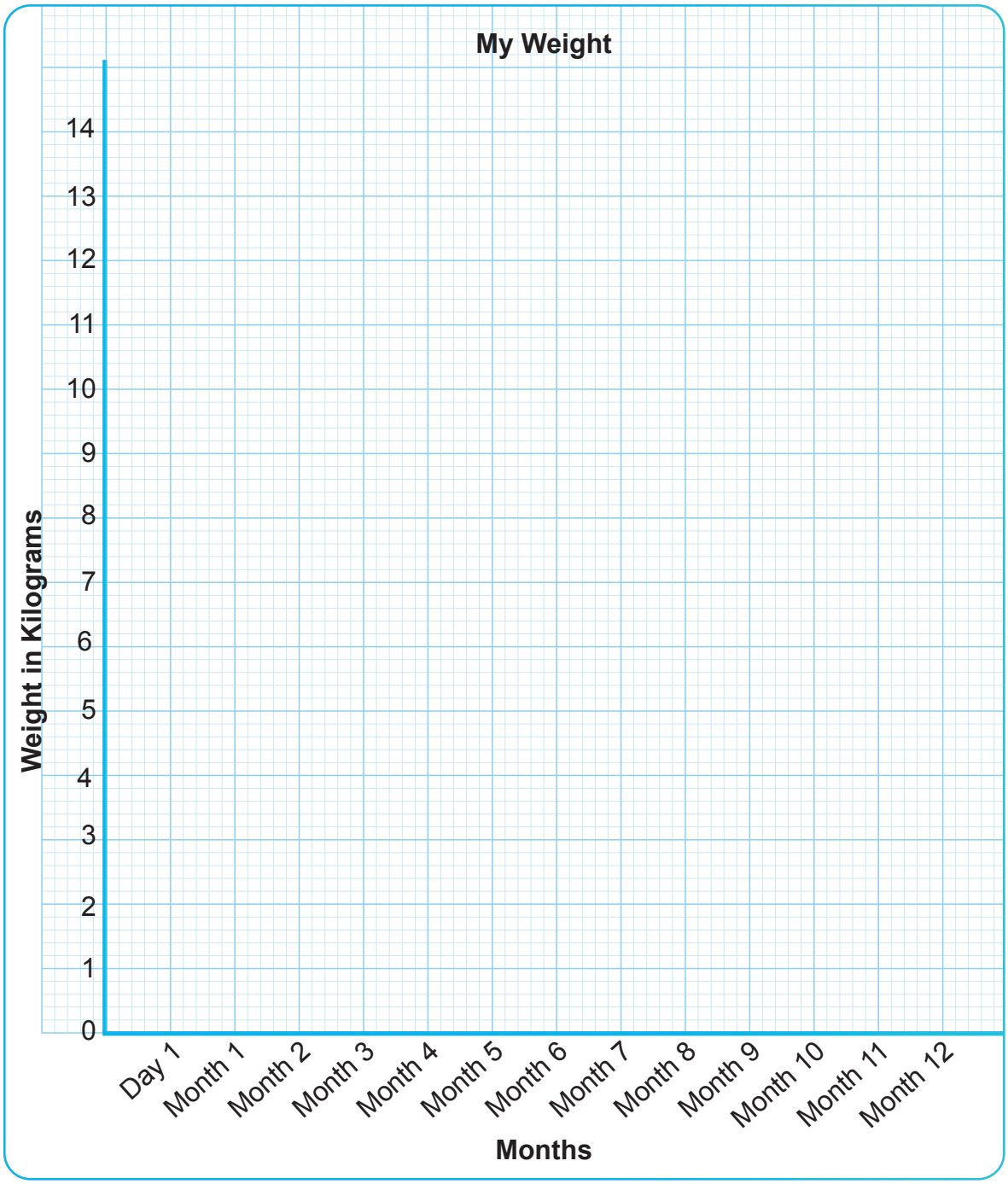
.....

Let's investigate

Line graphs show changes over time. Investigate the trends in your weight from the day you were born till 1 year old.

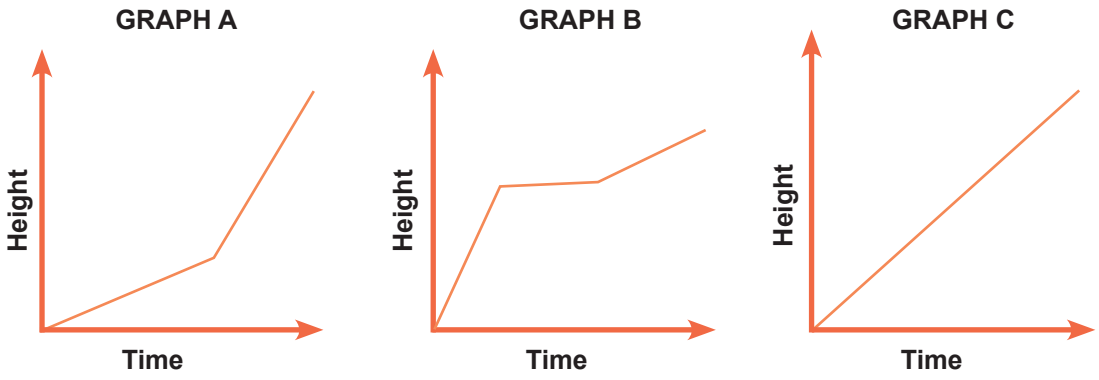
- Find your weight record with the help of your parents.
- Draw a line graph to represent your weight.
- Analyse your weight over time using the line graph.
    a) What is the overall trend of the line? Is it increasing, decreasing, or remaining constant?
    b) Are there any significant patterns within the trend?

Share your work with friends.


My Weight
Weight in Kilograms
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Day 1
Month 1
Month 2
Month 3
Month 4
Month 5
Month 6
Month 7
Month 8
Month 9
Month 10
Month 11
Month 12
Months

Put your thinking cap on

1 The following graphs show growth rate of 3 different plants over time.
Choose the graph that best represents each plant.



a) The plant grows taller at a steady pace.

GRAPH: .....

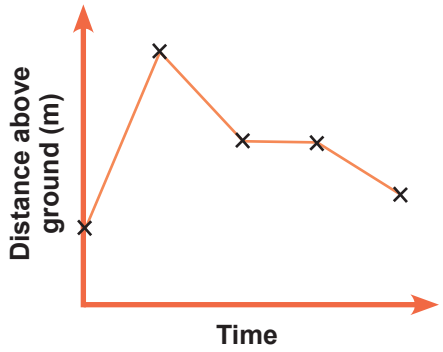
b) The plant grows quickly at first, remains a constant height for sometime, then grows at a steady pace.

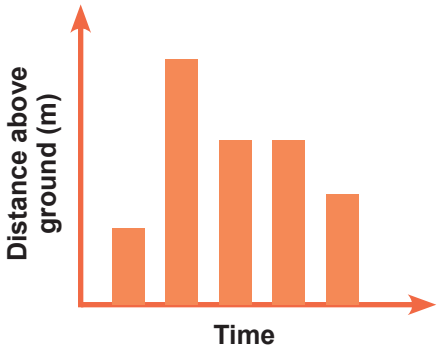
GRAPH: .....

c) The plant grows at a slow pace, then grows rapidly.

GRAPH: .....

2 Fazeela sketched her hiking trip to show the distance and time she spent. The line graph and bar graph, both show the same data.





a) Which graph is more appropriate?

.....

Share your thinking

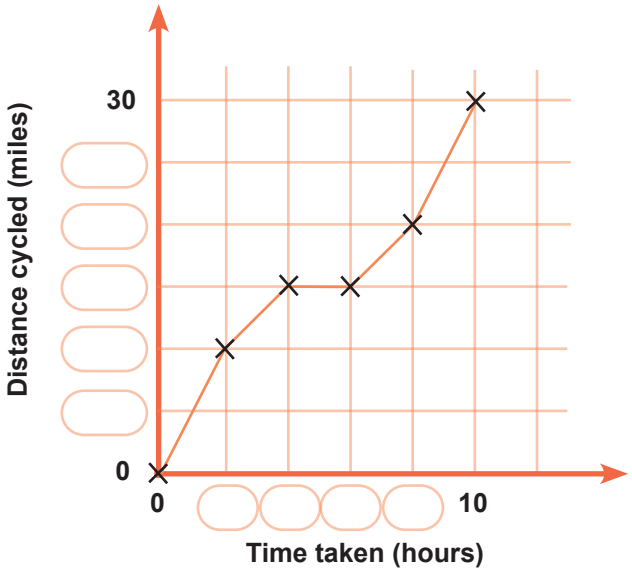
b) Explain your choice.

.....

.....

.....

3 The line graph shows the distance of Faheem's bike ride.



a) Fill in the missing labels.
b) How long did it take Faheem to travel 8 miles?

.....

c) During which intervals, did Faheem travel the fastest?

.....

d) What does the horizontal line on the graph indicate?

.....

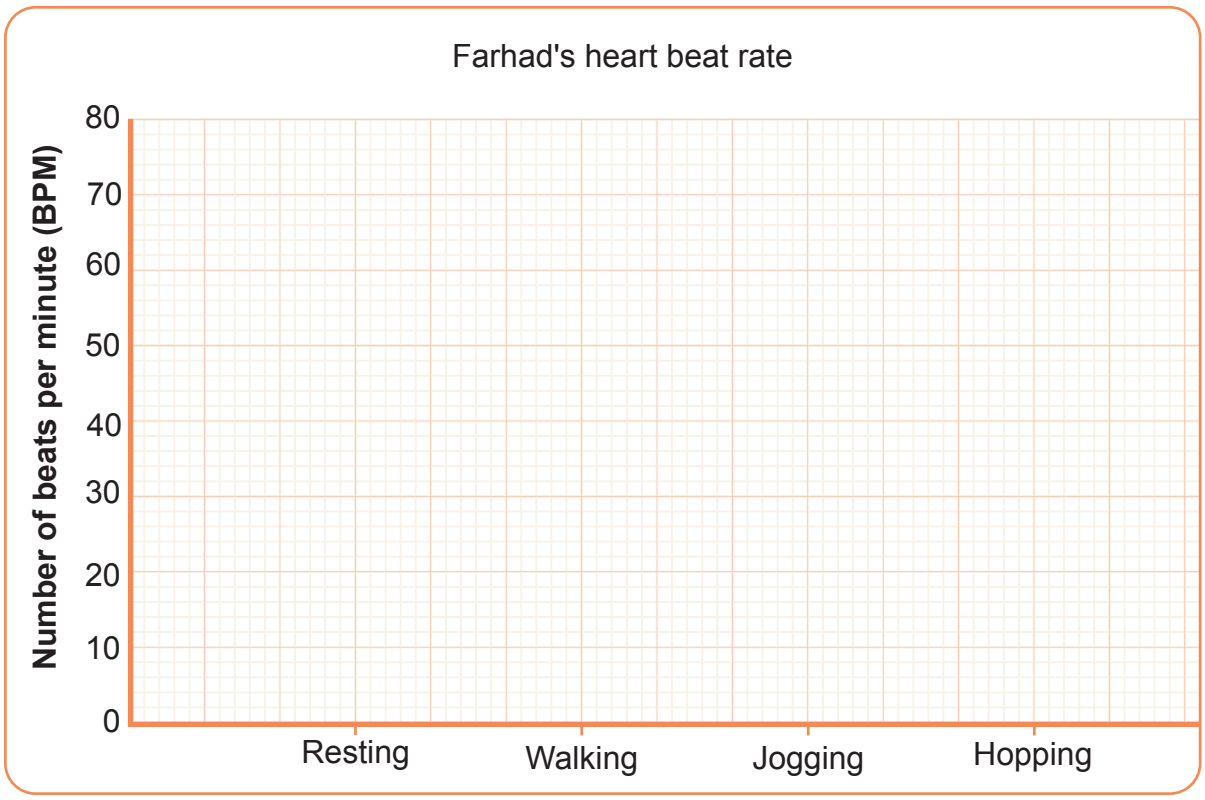
e) How far did Faheem travel in total?

.....

Self assessment

1 The following table shows Farhad's heartbeat rate of different activities in athletics practice. Draw a line graph to represent the data.

Activity	**Resting** (beginning of the practice)	**Walking** (1st activity)	**Jogging** (2nd activity)	**Hopping** (3rd activity)
Beats per minute (BPM)	70	120	135	160



a) What was the highest heartbeat rate recorded? When did this occur?

.....

b) What was the lowest heartbeat rate recorded? When did this occur?

.....

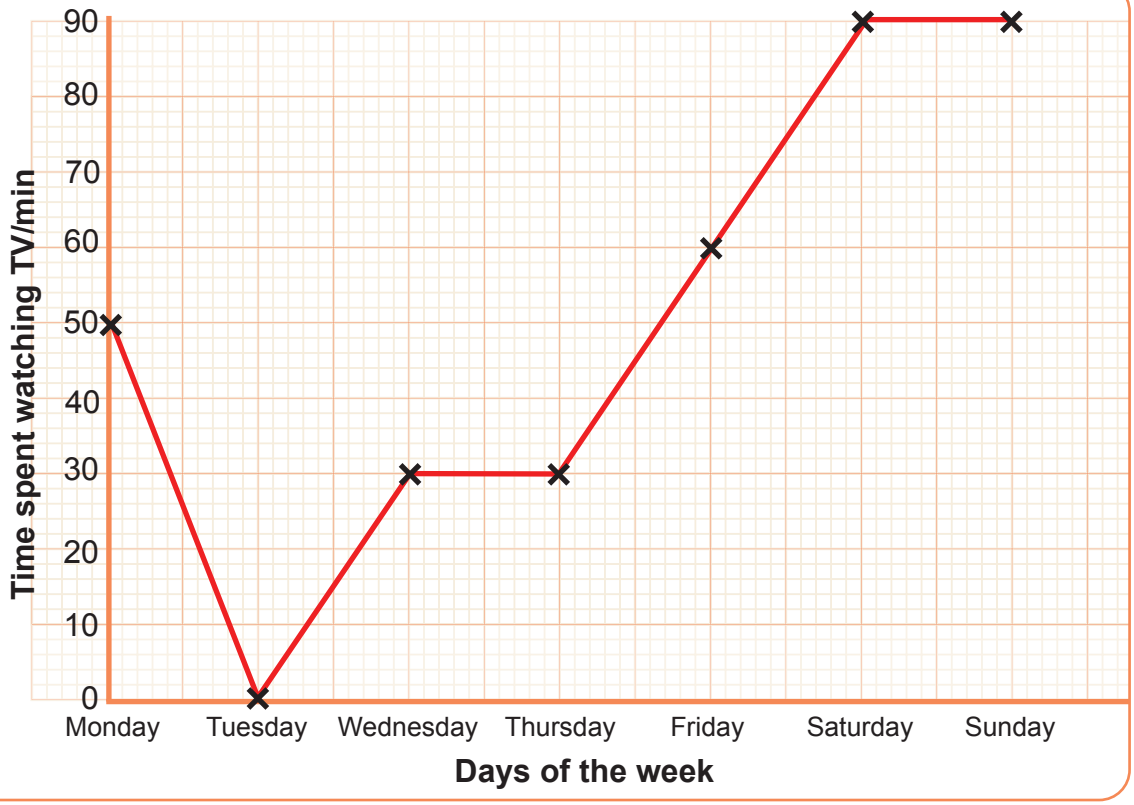
c) What is the overall trend of the line? Is it increasing or decreasing?

.....

d) Based on the heartbeat rates, what would happen to the rate, if Farhad do sprinting as the 5th activity?

.....

2 Zulfa plotted a graph to show the time she spent on watching TV during a week.



Select an activity of your choice and represent the time you spend on the activity using a line graph. Share your work with your friends.

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

I am good at ……

The mistakes I did are ……

What I learned from my mistakes are ……

Unit 11

Length, Mass & Capacity

I will learn to:

- Convert measurements from one unit to another.
- Choose appropriate units of measurement.
- Use decimal notation to record measurements.
- Estimate lengths, masses and capacities.

Math mindset

- Math is everywhere in my everyday experiences. From calculating cooking measurements and estimating travel time to measuring ingredients for a recipe or understanding patterns in data, I rely on Math to do even the simplest tasks.

Warm up

Math in Real Life

Measure the following.

Length	your pencil	a tree	your classroom
Measurement			

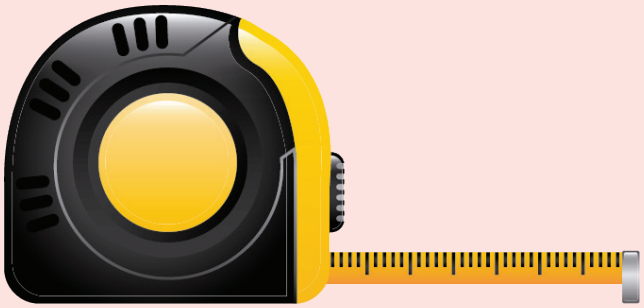
Mass	4 apples	your weight	a packet of almonds
Measurement			

Capacity	a jug	a glass of water	a bucket
Measurement			

In order to find a suitable unit of measure for something, it is important to consider and estimate its size first. This helps in deciding what an appropriate unit might be, given the size of the quantity being measured.

Share your thinking

- To get an accurate measurement, it is very important to use an appropriate unit and equipment.
- What did you use to measure the length of the tree?
- If you want to measure a tall tree, which unit would be suitable? mm, cm, m or km? What is the reason?
- What did you use to measure the length of the classroom? What is the reason?

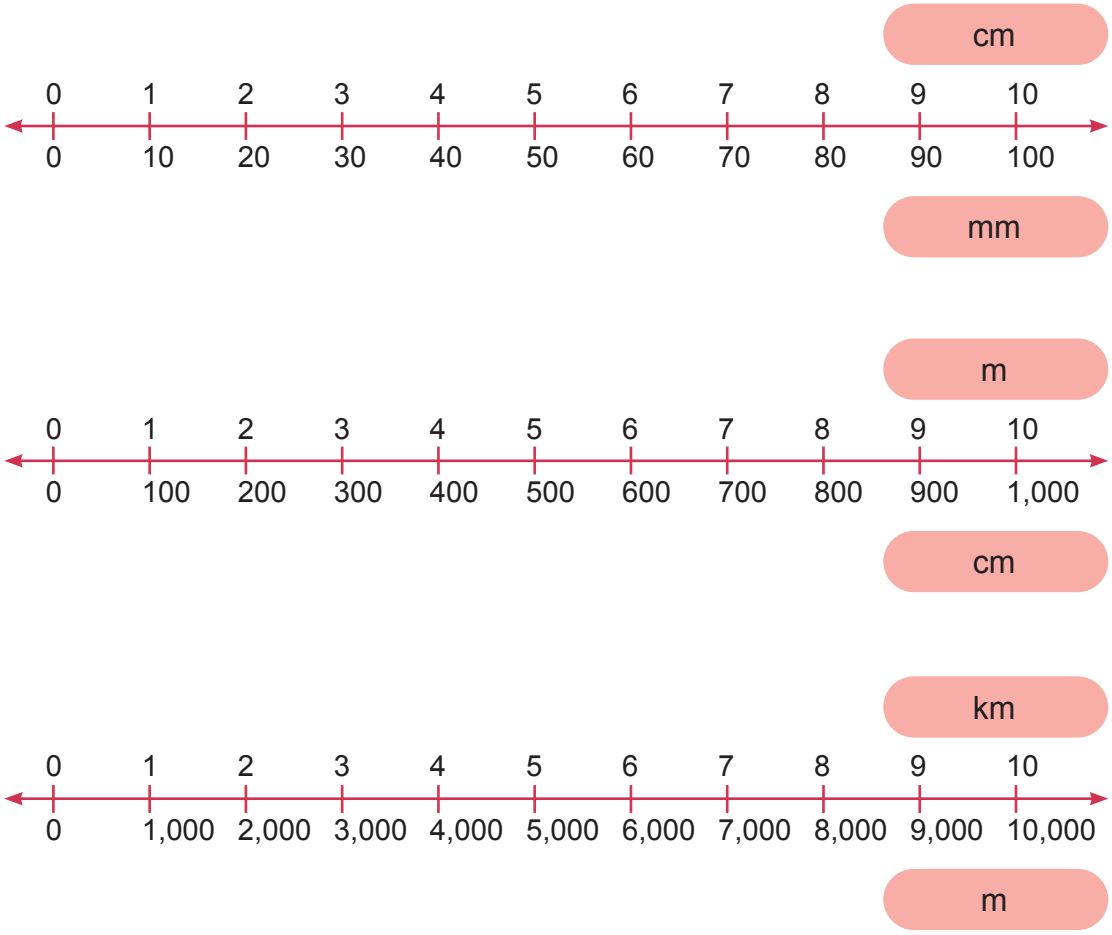


Measuring and converting units

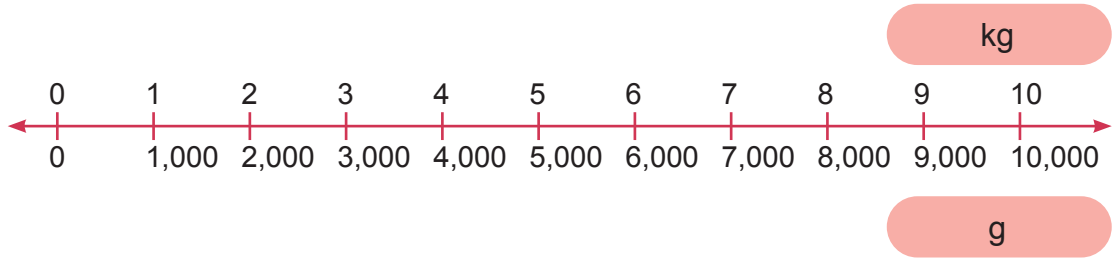
In grade 3, you have learned measuring and converting units. Let's recall it using different visual aids and learn more about measurements and unit conversions.

The number lines show one unit of measurement on top and an equivalent smaller unit on the bottom. Look for a pattern.

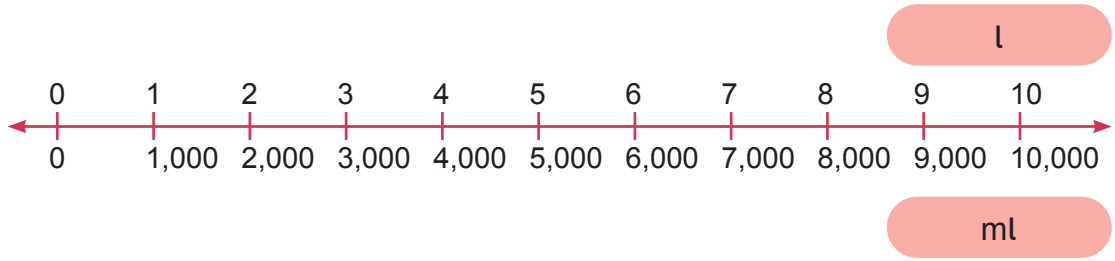
1. Length



2. Mass



3. Capacity



Let's investigate

Analyse the number lines. It shows the relationship between the units of length, mass and capacity. In groups, discuss and present the relationship between these units and show your own examples.

Example 1

In an Athletics championship, athletes compete in races of the following lengths:

100 metres, 200 metres, 400 metres, 800 metres, 1,500 metres, 5,000 metres and 10,000 metres.

If an athlete was to run in all these races, how many kilometres would he run?

100	200	400	800	1,500	5,000	10,000
18,000 m						

km	m
1	1,000
?	18,000

Which unit is bigger? km or metre? Look at the arrows. To convert m to km, divide by 1,000.

The table shows 1 km is 1,000 metres.
How many kilometres are equivalent to 18,000 m?

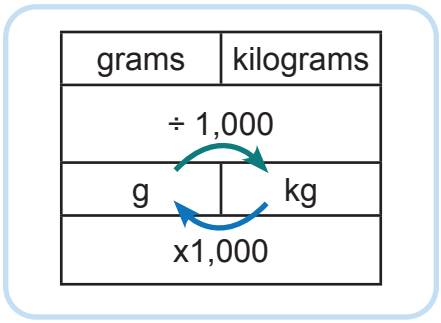
18,000 ÷ 1,000 = 18 km
18,000 metre is equal to 18 kilometres.

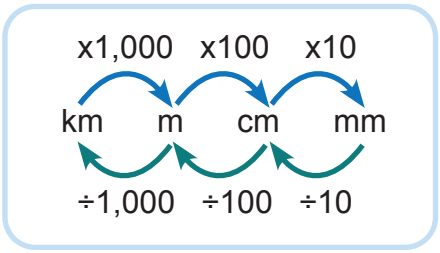
km	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18
m	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000	17,000	18,000

Let's collaborate

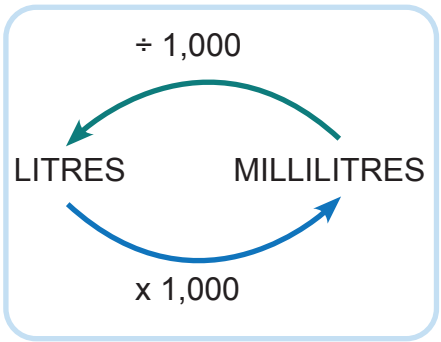
Do you remember multiplication and division by 10, 100 and 1,000?

The 3 diagrams show that you have to use multiplication to convert larger metric units to smaller units. Discuss and explain why?





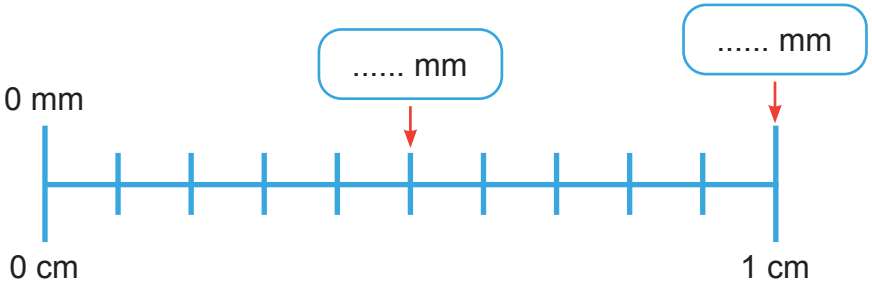
The 3 diagrams show that you have to use division to convert smaller units to larger units. Discuss and explain why?



Exercise 1: Millimetre and centimetre

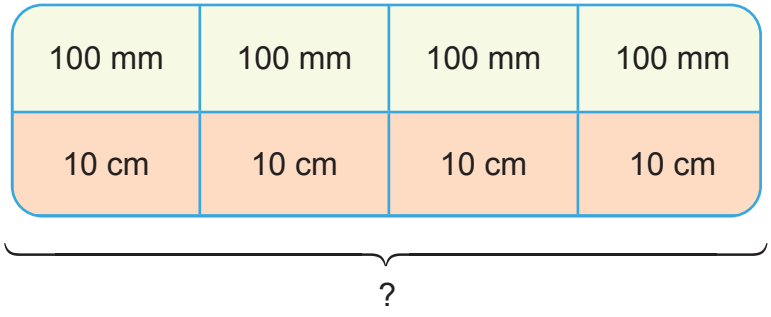
1 Complete the following equations

a) There are ..... mm in 1 cm.



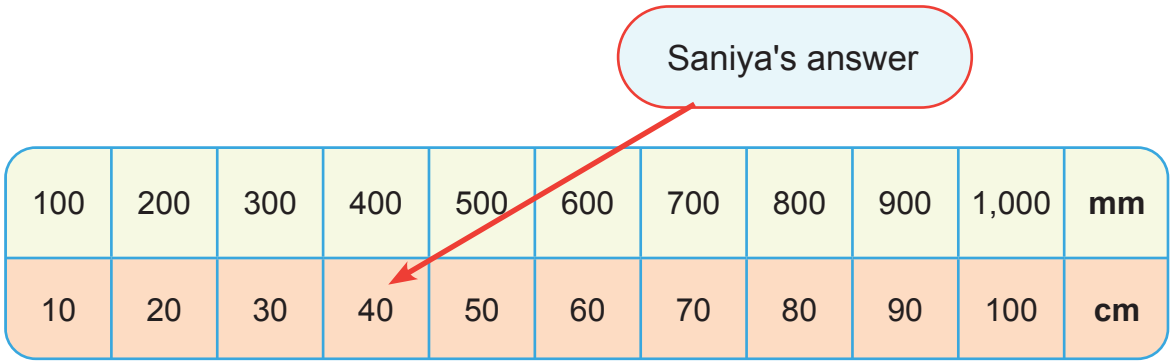
b) 400 mm = ... cm

To complete the equation, Majid used a bar model.



To complete the equation, Saniya completed the following table.

10	20	30	40	50	60	70	80	90	100	**mm**
1	2	3	4	5	6	7	8	9	10	**cm**



100	200	300	400	500	600	700	800	900	1,000	**mm**
10	20	30	40	50	60	70	80	90	100	**cm**

However, Mariyam used division to find the answer.
She divided 400 by 10 to get the answer. Check if Majid's, Saniya's and Mariyam's answers are same.

Share your thinking

Do you agree with their methods? Discuss. Why do you think Mariyam used division to get the answer? Which method do you prefer? Explain your reasons.

2 Match the following.

10 cm	10 mm
0.5 cm	1,000 mm
1 cm	5 mm
35 cm	100 mm
100 cm	350 mm

3 Complete the following.

a) 10 cm = how many millimetres?

10 cm = ... mm

b) 100 cm = how many millimetres?

100 cm = ... mm

Let's collaborate

Explore the equivalence between centimetre and metre. Use a centimetre and metre ruler to find the equivalence between two units.

Measure your classroom in centimetres and metres.

Length of your classroom in cm	Length of your classroom in m

Which unit is more suitable to measure the length of the classroom? cm or m? why?

.....

.....

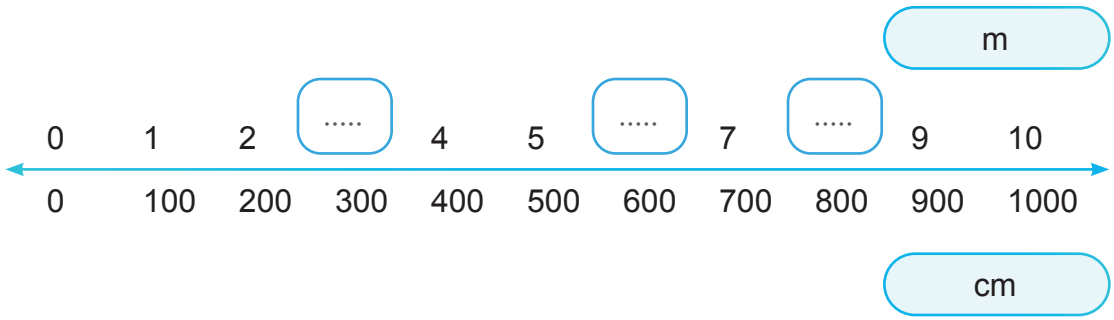
.....

.....

.....

Exercise 2: Centimetre and metre

1 Complete the number line.



2 Arrange the measurements in descending order.

5 m, 900 cm, 55 m, 500 cm, 60 m, 90 cm

.....

3 Complete the equations. Use number lines, tables or model diagrams to find the answers.

a) 2 m = ……. cm

m	cm
1 m	100 cm
2 m	?

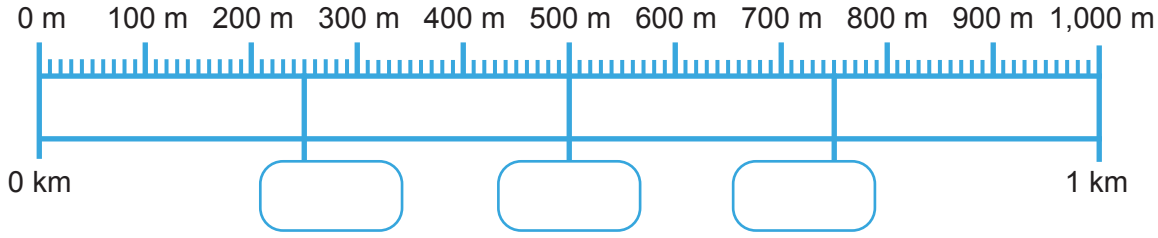
b) 3 m = ……. cm

1	2	3	4	5	6	7	8	9	10	m
100										cm

c) There are ……. centimetres in 1 metre.

Exercise 3: Metre and kilometre

1 Use the number line to complete the sentences.



a) 1 km is equivalent to ..... m

b) $\frac{1}{2}$ km is equivalent to ..... m

c) $\frac{1}{4}$ km is equivalent to ..... m

d) $\frac{3}{4}$ km is equivalent to ..... m

? Do you remember fractions on number line?

2 Complete the statements.

a) 5 km = ... m

b) 250 m = ... km

c) 6 km and 500 m = ... m

d) 2,500 m – 1,500 m = ... km

e) 9 km + 2 km = ... m

f) 8 km – 6,000 m = ... km

3 Add the measurements. Give your answer in kilometres.

5 km	7,000 m	10 km and 500 m	3 km and 500 m

5 km	7,000 m	10 km, 500 m	3 km, 500 m
?			

Let's investigate

Find your own metre.

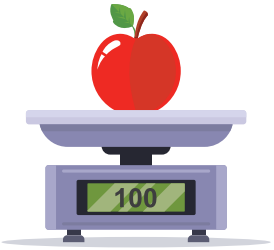
Find a measurement that can be used to estimate 1 metre. It might be the distance from hand to hand when your arms are stretched out sideways. It might be the distance from the floor to your shoulder. It might be the length of two or three of long footsteps.

Exercise 4: gram and kilogram

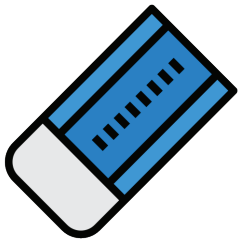
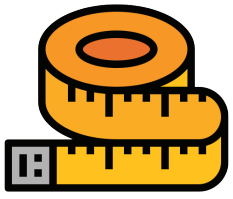
1 Which unit is best to measure the mass of an apple?

☐ grams

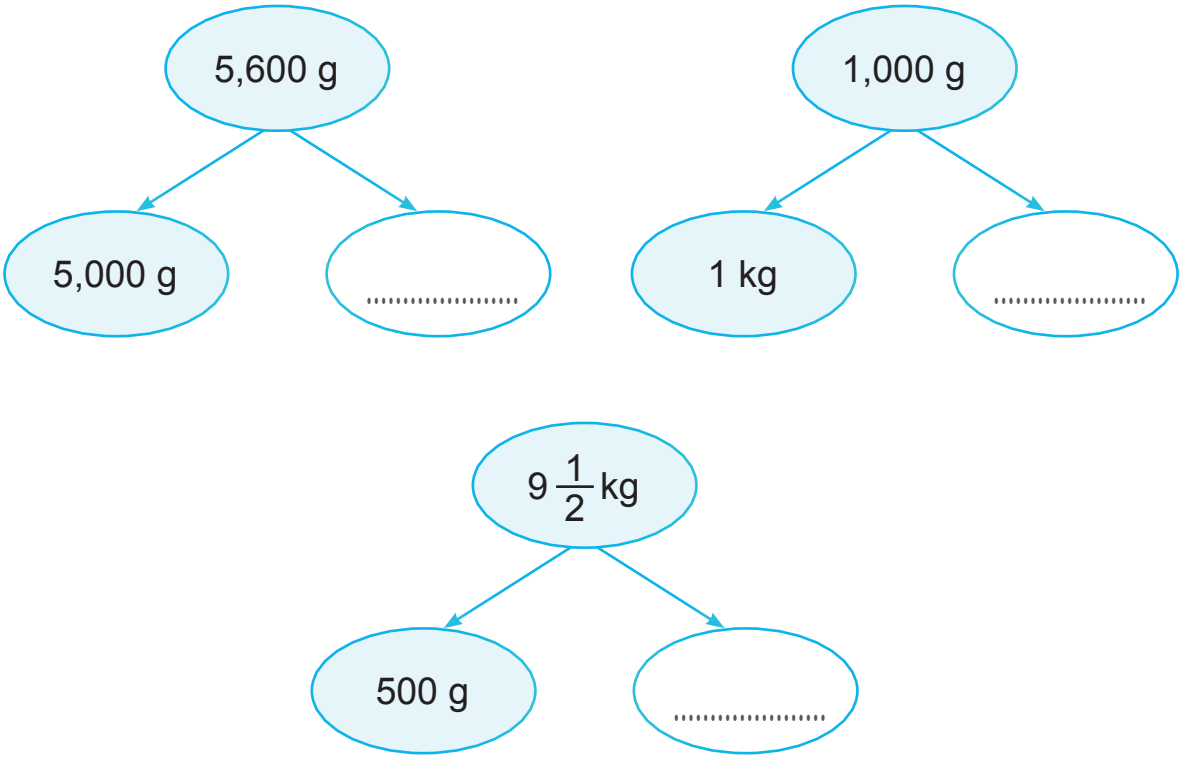
☐ kilograms



2 How much is 1 kg? Fill in the blanks with < , > or = .

 The box is …….. 1 kg.	 The eraser is …….. 1 kg.
 The bag is …….. 1 kg.	 The measuring tape is …….. 1 kg.

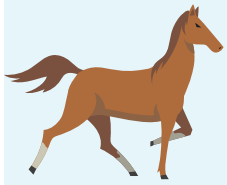
3 Complete the following models.



4 Estimate the weight of each object. Circle the estimated weight.

1,300 kg

1,000 g



5,000 g

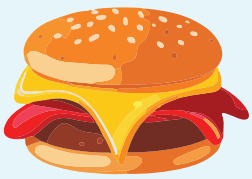
45 kg

20 g

1 kg

120 g

2 kg



15 kg

150 g

Exercise 5: litre and millilitre

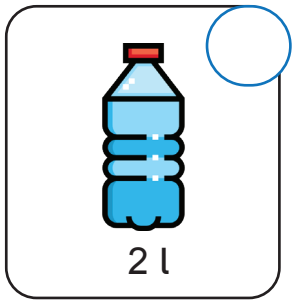
1 Complete the number line.

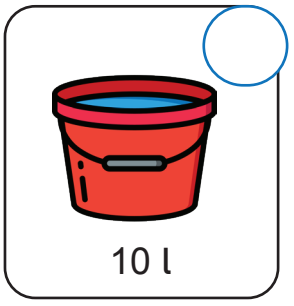
1	2	3	4	5	6	7	8	9	10	l
										ml

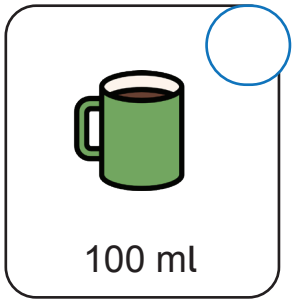
2 Number the objects in ascending order of capacity.


150 ml

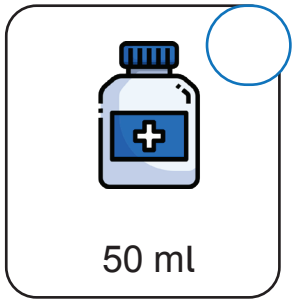

1 l

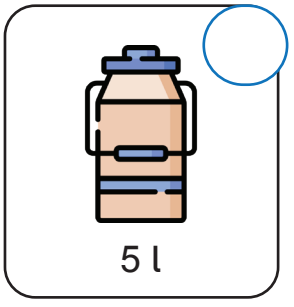

2 l


10 l


100 ml

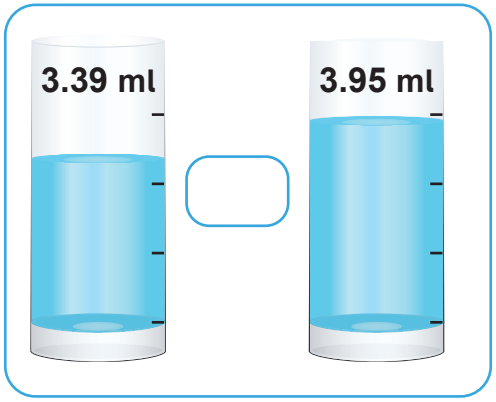

500 ml


50 ml

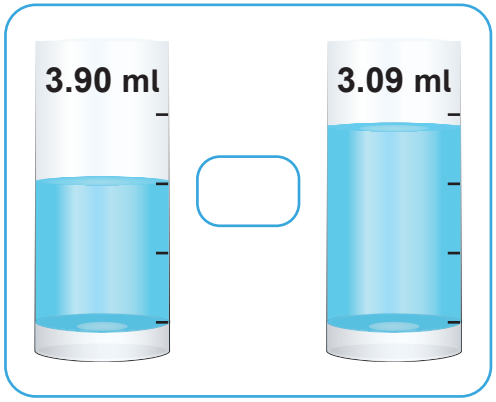

5 l

3 Compare the volumes and put < or >.

a)



b)



4 Circle 'yes' if the object can hold more than 1 litre of liquid. Circle 'No' if the object holds less than 1 litre of liquid.

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

5 Write <,> or = to compare the measurements.

a) 0.7 litres ☐ 0.7 millilitres

b) 0.32 kg ☐ 302 g

Let's investigate

a) Select a container that holds slightly more than 1 litre and an item that holds slightly less than 1 litre.
b) Estimate the capacity of the two containers. Explain how you estimated capacity of the two containers.
c) Check your estimates using a suitable measuring tool.

Measuring and converting units with decimals

In unit 8, we have learned decimals. Now, let's explore measurements with decimals.

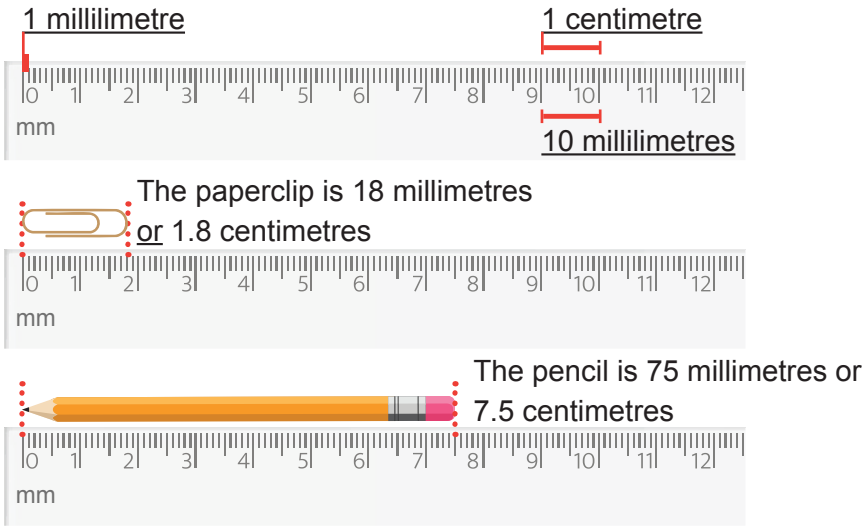
Math in Real Life

Use rulers to measure various objects to the nearest centimetre.
Sometimes objects are longer than a whole centimetre but not quite a full centimetre.
Discuss the limitations of measuring to the nearest centimetre.
Sometimes we need to measure things more accurately than just whole centimetres.
Discuss the scenarios that need accurate measurements such as:
A pharmacist preparing a medication for a patient.

- A construction team working on a project of building a house.
- Time management.
- Sports and athletics; fair competitions.
- Cooking; using recipes.

Length

10 mm = 1 cm
1 mm = $\frac{1}{10}$ cm = 0.1cm
1 mm is one-tenth of 1 cm



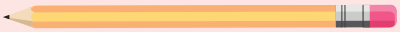
Example 1

Look at the colour pencils.

a) The length of pink colour pencil is 6 cm, 5 mm. What is the length in millimetres?

$$\begin{aligned} 6\text{ cm, }5\text{ mm} &= 6\text{ cm} + 5\text{ mm} \\ &= 60\text{ mm} + 5\text{ mm} \\ &= 65\text{ mm} \end{aligned}$$

b) The length of yellow colour pencil is 5 cm, 2 mm. What is the length in centimetres?



$$\begin{aligned} 5\text{ cm, }2\text{ mm} &= 5\text{ cm} + 2\text{ mm} \\ &= 5\text{ cm} + \frac{2}{10}\text{ cm} \\ &= 5\text{ cm} + 0.2\text{ cm} \\ &= 5.2\text{ cm} \end{aligned}$$

c) The length of blue colour pencil is 87 mm. What is the length in centimetres and millimetres.

$$\begin{aligned} 87\text{ mm} &= 80\text{ mm} + 7\text{ mm} \\ &= 8\text{ cm} + 7\text{ mm} \\ &= 8\text{ cm, }7\text{ mm} \end{aligned}$$

d) What is the length of blue colour pencil in centimetres?

$$\begin{aligned} 8\text{ cm, }7\text{ mm} &= 8\text{ cm} + 7\text{ mm} \\ &= 8\text{ cm} + \frac{7}{10}\text{ cm} \\ &= 8\text{ cm} + 0.7\text{ cm} \\ &= 8.7\text{ cm} \end{aligned}$$

Example 2

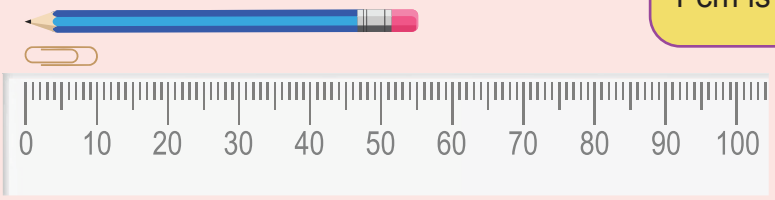
What is the length of the blue pencil in metres?

Look at the pencil and the clip.

100 cm = 1 m

1 cm = $\frac{1}{100}$ m = 0.01 m

1 cm is one-hundredth of 1 m



The length of the clip is 10 cm. What is the length of hair clip in metres?

1 cm = $\frac{1}{100}$ m = 0.01 m

10 cm = $\frac{10}{100}$ m = $\frac{1}{100}$ m = 0.1m

Equivalent fractions

Example 3

Length of a fabric is 1 m 37 cm. What is the length in metres?

What is the length of the fabric in centimetres?

1 m 37 cm = 1 m + 37 cm

= 1 m + $\frac{37}{100}$ m

= 1 m + 0.37 cm

= 1.37 m

Example 4

A marathon is 42 kilometres and 195 metres long. How many metres is this?

42 km 195 m = 42 km + 195 m
= 42,000 m + 195 m
= 42,195 m

Example 4

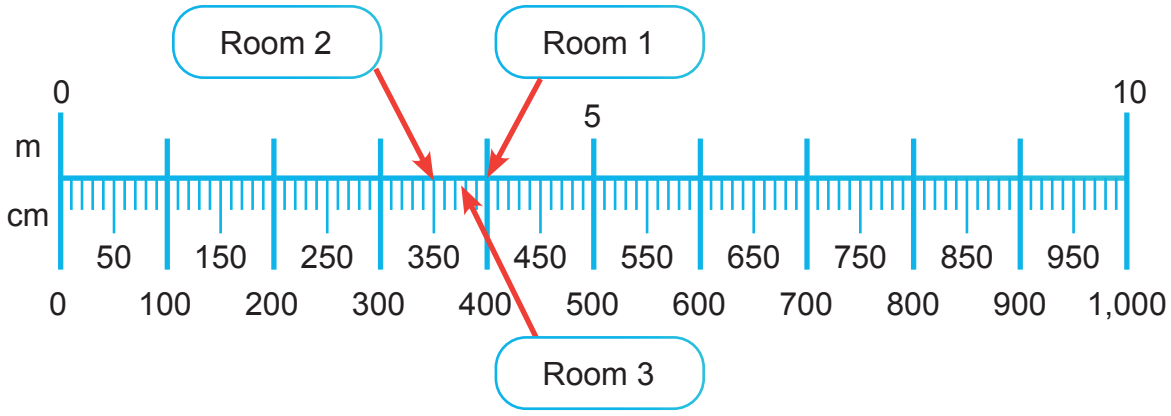
A runner trains for a marathon by running 3,040 metres every day. How many kilometres and metres does the runner run in total each day?

3,040 m = 3,000 m + 40 m
= 3 km + 40 m
= 3 km 40 m

Exercise 6

1 Hussain and Shaana helped their parents to measure the length of the rooms of their house to see the things that would fit in each room.

Room 1	4 metres
Room 2	3.5 metres
Room 3	3.75 metres



a) Compare the lengths of the rooms and put the symbol > or <.

Room 1 ☐ Room 2 ☐ Room 3

b) Write the sizes of the lengths in ascending order.

.....

c) Now record the lengths in metres and centimetres.

Room	In metres	In centimetres
Room 1		
Room 2		
Room 3		

2 A garden hose is 25 metres long. How many centimetres long is it?

.....

3 A pencil is 15 centimetres long. How many millimetres long is it?

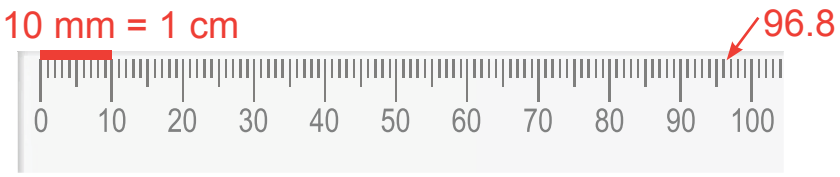
.....

4 A road is 5 kilometres long. How many metres long is it?

.....

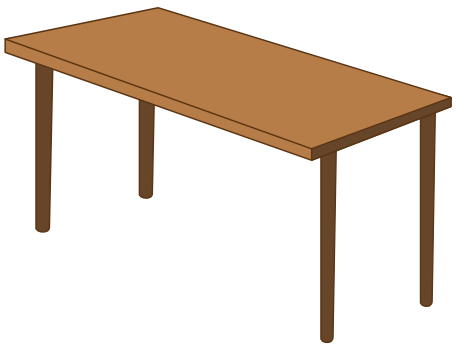
5 Sameer measured a line for his art project. It is 96.8 millimetres long. How many centimetres is the line?

.....



6 Measure your desk in centimetres and millimetres.

Length of your desk in mm	Length of your desk in cm



7 Maleeha rides her cycle 7,659 metres per day. How many kilometres does she cycle in a day?

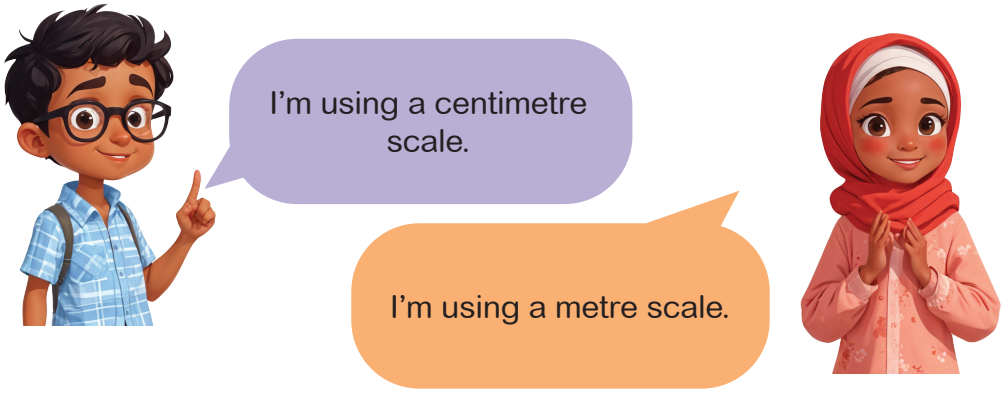
.....

8 A swimming competition was held to mark Martyr's day, 1st Sha'baan. The swimmers have to swim from Villigili to Male', which is 2,500 m. What is the distance in km?

.....

.....

9 Farhana and Dhanish are measuring the length of their physical education hall.



a) Whose unit is more appropriate? Explain your answer.

.....

b) Dhanish has measured the length as 689 cm. What answer will Farhana get in metres?

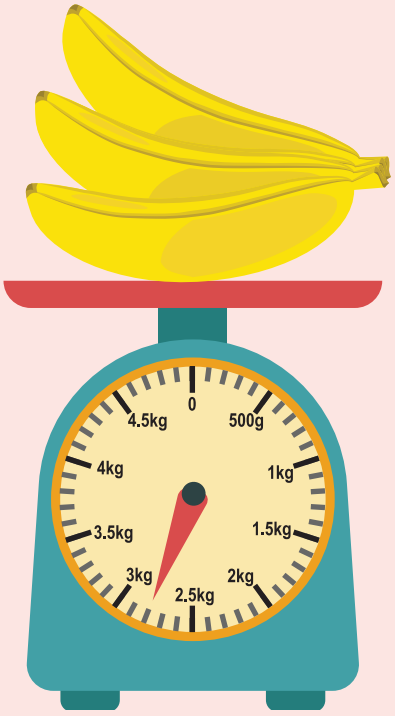
.....

.....

Mass

Example 1

What is the weight of the bunch of bananas in grams?
The arrow is between 2 kg and 3 kg, but what do the intervals represent?



1 kg = 1,000 g

Ten slots of 100 gram represents 1 kg.
The kilograms are split up into 10 slots, so each one must represent 100 g.
The arrow is on the eighth slot after 2 kg, so the weight of the bananas is 2 kg 800 g.

2 kg 800 g = 2,000 g + 800 g
= 2,800 g

What is the weight of the bunch of bananas in kilograms?
Ten 100 g makes 1 kg

100 g + 100 g + 100 g + 100 g + 100 g + 100 g + 100 g + 100 g + 100 g + 100 g = 1000 g = 1 kg

800 g is eight tenth of 1 kg

100 g is one-tenth of 1 kg
100 g = 0.1 kg

If 100 g = 0.1 kg
200 g = 0.2 kg
800 g = 0.8 kg

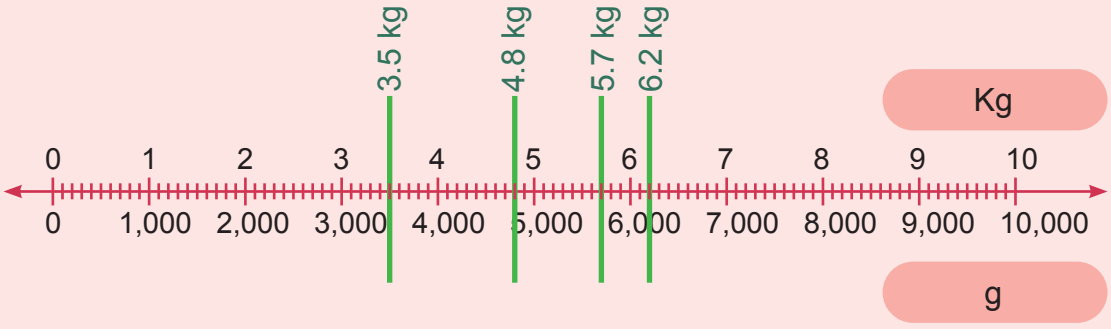
2 kg 800 g = 2 kg + 800 g
= 2 kg + 0.8 kg
= 2.8 kg

$\frac{800}{1000} = \frac{80}{100} = \frac{8}{10} = 0.8$

Example 2

Below is the four months record of baby Nabeel's weight.

Month 1	3.5 kg
Month 2	4.8 kg
Month 3	5.7 kg
Month 4	6.2 kg



The number line shows kilogram on top and an equivalent smaller unit, gram on the bottom.

Look for a pattern.

The green lines show weight of Nabeel's weight. Now, lets record the weight in grams and kilograms using the number line.

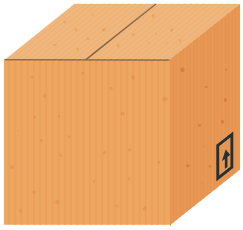
Month	In kilograms	In kilograms and grams
Month 1	3.5 kg	3 kg and 500 g
Month 2	4.8 kg	4 kg and 800 g
Month 3	5.7 kg	5 kg and 700 g
Month 4	6.2 kg	6 kg and 200 g

Exercise 7

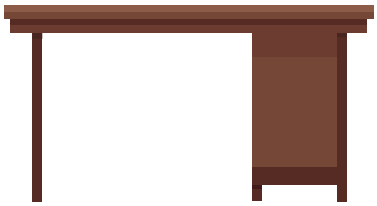
1 Draw lines from each object to the best measurement unit for it.

A toy car

A spoon



A full box



A desk

Kilograms

Grams

2 A recipe calls for 250 grams of flour. How many kilograms is this?

.....

3 A package of meat weighs 2.5 kilograms. How many grams is this?

.....

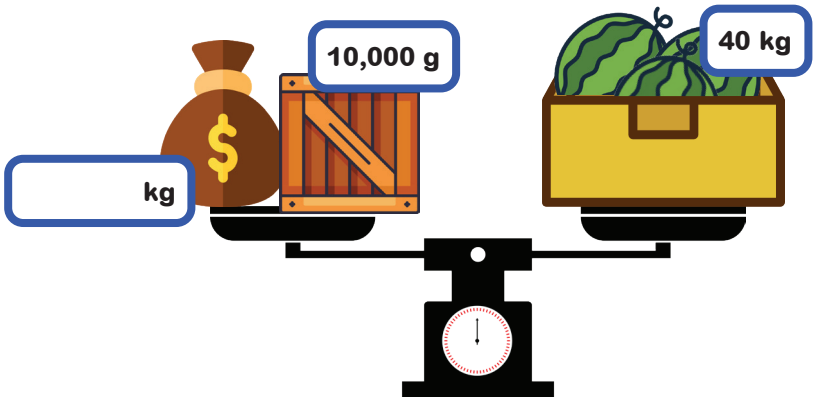
4 A recipe calls for 500 grams of sugar. You only have a kitchen scale that measures in kilograms. How many kilograms of sugar do you need?

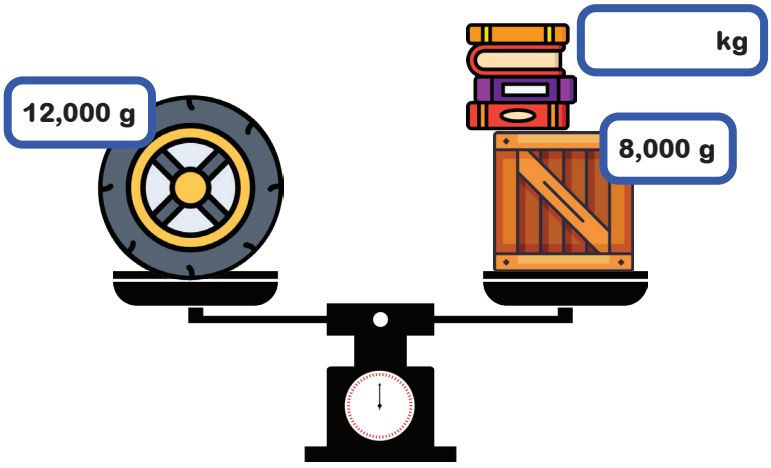
.....

5 A nutrition label indicates that a serving of cereal contains 12 grams of fibre. If the package contains 10 servings, how many kilograms of fibre are in the entire package?

.....

5 Make the scales balance by calculating the unknown weight.





Math Language

What is the difference between length and height? Discuss and come up with 2 examples. Present your examples to the class.

Capacity

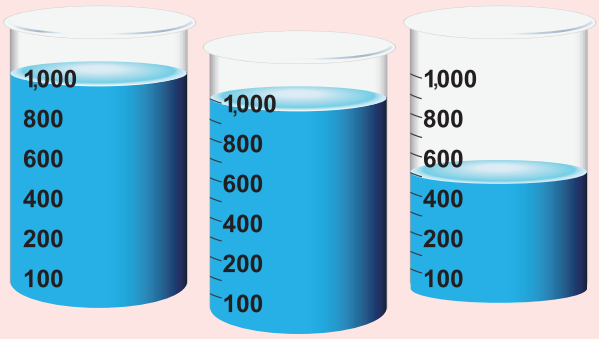
Example 1

The capacity of a container is 2 litres and 500 millilitres. What is the capacity of the container in millilitres?

1 litre is equal to 1,000 ml

Math Language

milli means one part out of a thousand



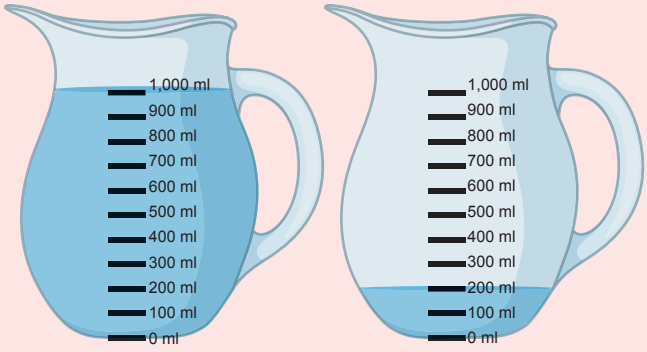
I know 500 is half of 1,000
Half is same as 0.5.

The first beaker shows 1,000 ml = 1 l
The second beaker shows 1,000 ml = 1 l
The third beaker shows 500 ml = 0.5 l

2 l 500 ml = 2 l + 500 ml
= 2,000 ml + 500 ml
= 2,500 ml

Example 2

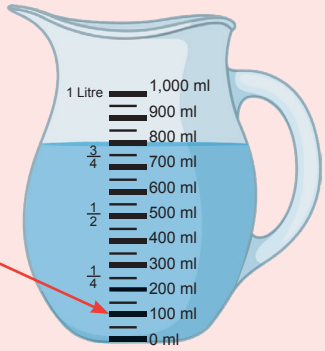
What is the total volume of juice in the jugs in millilitres?



100 millilitres is equal to one-tenth of a litre.

1 litre									
100 ml	100 ml	100 ml	100 ml	100 ml	100 ml	100 ml	100 ml	100 ml	100 ml

one-tenth = $\frac{1}{10}$ = 0.1



1 l 200 ml = 1 l + 200 ml
= 1 l + 0.2 ml
= 1.2 ml

If 100 ml = 0.1 l
200 ml = 0.2 l
300 ml = 0.3 l

Exercise 8

1 Match the proper unit of measurement.

A teacup

A gallon bottle

A pitcher

A glass

Millilitres

Litres

2 Express the measurements in litres.

a) 3 litres and 500 millilitres

.....

b) 4 litres and 500 millilitres

.....

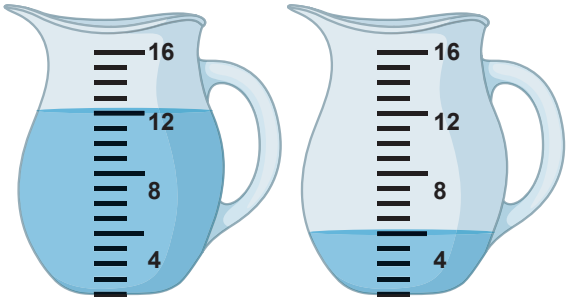
c) 5,000 millilitres

.....

d) 3 litres and 3,000 millilitres

.....

3 Pour one half of the jug A into the jug B. Draw both jugs again.



Jug A Jug B Jug A Jug B

4 Circle the best estimate of capacity.

A glass	A teapot	A backpack
		
Less than 1 l	Less than 1 l	Less than 1 l
About 1 l	About 1 l	About 1 l
More than 1 l	More than 1 l	More than 1 l

5 Express the measurements in litres and millilitres.

	In litres	**In litres and millilitres**
a)	1,500 ml	.....
b)	7,900 ml	.....
c)	2,350 ml	.....
d)	7,050 ml	.....

Put your thinking cap on

1 Four students made towers using blocks.

a) What is the total height of the towers? Give your answer in cm.

95 cm	1 m and 11 cm	1 m and 50 mm	89 cm

Let's collaborate

b) Why is it important to include the units in the answer? Discuss in your groups.

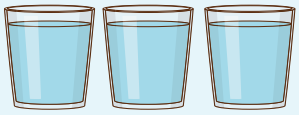
2 Write the capacity of each individual container.

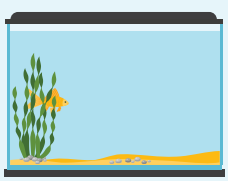
a) 

milk bottle

3 l =   =.....

b) 
tea pot

900 ml =   =.....

c) 
fish tank

48 l =   =.....

d)

juice packet

1 l = 

 =.....

e)

mango pulp

2 l = 

 =.....

3 Three children are partitioning 5,629 g.
Niuma says: 5 kilograms and 629 grams.
Habeeb says: 56 kilograms and 29 grams.
Gasim says: 5 kilograms and 6,290 grams.

Who is right? Give reasons.

.....

.....

4 Ramsha has 7 m of fabric. She uses 3 m and 74 cm to stitch a dress. She works out how much fabric she has left using the following models.

STEP 1: Bar model

7 m	
3 m and 74 cm	?

STEP 2: 7 m – 3 m = 4 m
4 m – 74 cm
= 400 cm – 75 cm
= 325 cm + 1
= 326 cm

STEP 2:

To subtract 74 from 400, I first added 1 to 74 to make it a friendly number.
100 - 75 is 25.
So 400 – 75 = 325

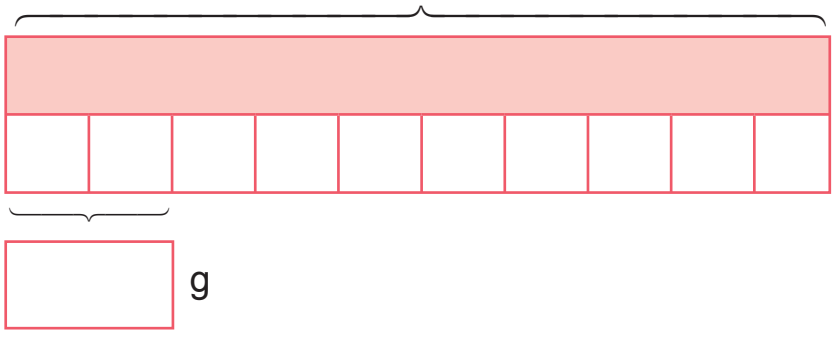
Use the idea of Ramsha to solve the following problem and write your process to find the answer in the empty box. Discuss with your friends.

Manisha needs 900 cm of tinsel for decoration. There are 2.99 m of tinsel in the storage room. How much more tinsel does she need?

900 cm	
2 m and 99 cm	?

5 Fill in the labels on the bar model.

2 kg = ☐ g



6 The capacity of a container is 900 ml. The capacity of a cup is 700 ml less than the capacity of the container.

a) What is the capacity of the cup?

.....

b) What is the total capacity of the container and the cup? Give your answers in litres and millilitres.

.....

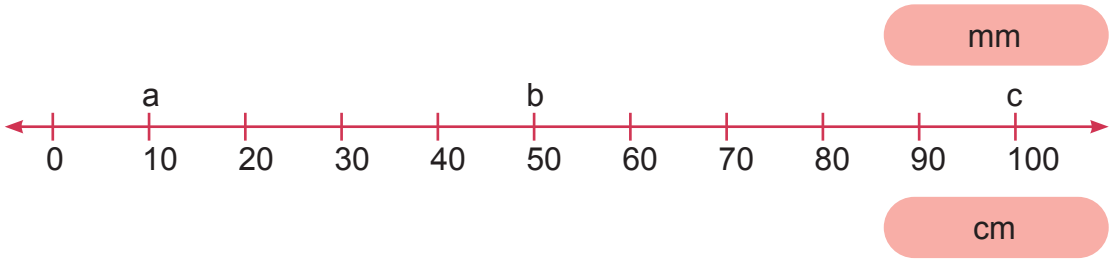
Self assessment

1 What is the place value of the 6 in each measurement? Use the table to identify the values.

1.65 cm	61.4 km	10.96 kg	645.11 g	526.44 ml

Hundreds	Tens	Ones		Tenths	Hundreds
			.		

2 Complete the following number line.



If a = 100 mm, find the value of b and c.

3 a) Complete the metre and kilometre track below.

Metre	1		1.3	0.5	3.3
Centimetre		1,200		500	

b) How many metres are there in half a kilometre?

c) Write two equivalent fractions for the fraction $\frac{1}{10}$

d) Complete the following fraction and decimal track.

				0.5					1
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$

4 Ahmed was walking near the neighbourhood when he saw a pond. The board near the pond says 9,000 ml of water. He wanted to see how many litres it contained. Help Ahmed convert 9,000 ml into litres.

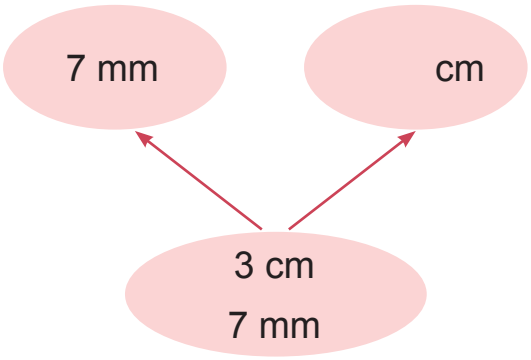
5 Ramiz bought 1,025 g of nuts for ৳ 75.

a) Convert 1,025 g into kilograms.
b) How many 50 laaris are there in ৳ 75?
c) Complete the following patterns.

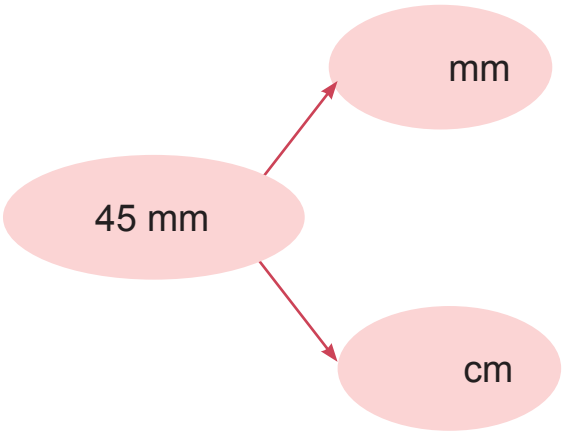
i) 9.1 kg, 9.2 kg, ……., ……., ……., …….
ii) 1,000 ml, 1,200 ml, ……., ……., ……., …….
iii) 2.1 mm, 2.3 mm, ……., ……., ……., …….

6 Complete the part whole models.

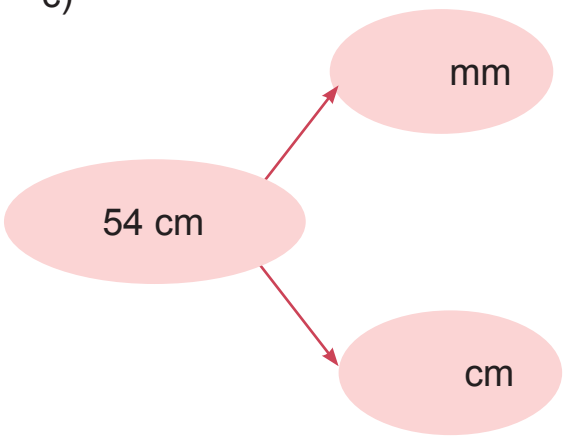
a)



b)



c)



7 The Environment Club of a school decided to plant 100 trees in the school garden. The length of plants are measured and noted.

Name of the student	Name of the plant	Measurement of the plants in m and cm
Mohamed Alyaan	Indian Neem	85 cm
Hussain Shayaan	Frangipani	150 cm
Ali Niyaz	Coconut tree	132 cm
Moosa Layan	Mango tree	1.25 m

a) Change the measurement of the plants to metres.
   Alyan:
   Shayan:
   Niyaz:
   Layan:

b) What is the height of the tallest plant?
c) Who brought the shortest plant?
d) What is the difference between the height of the shortest and the tallest plant?
e) Compare the heights and arrange the name of the plants in descending order.

Do you know? A simple act of planting trees can help to cleanse the air in your surroundings.

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

I am good at ……

The mistakes I did are ……..

What I learned from my mistakes are ……

Unit 12

Perimeter & Area

I will learn to:

- Measure and record perimeter and area.
- Choose appropriate units to measure perimeter and area.
- Calculate perimeter and area.
- Estimate perimeter and area.

Math mindset

- I can understand Math if I give myself a chance.
- Struggling is part of doing Mathematics. I don't fear the struggle.
- My mind is flexible enough to do hard things.
- My effort makes a difference.

Warm up

In grade 3, you have learned the perimeter of simple shapes.

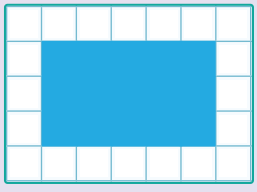
Share your thinking

1 Discuss how you would find the perimeter of your desk using a ruler or measuring tape.

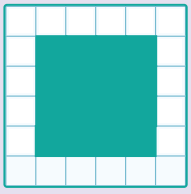
a) Find the perimeter of your desk and compare your measurement with others. Is there any difference? Discuss.

b) Discuss the units used to measure the perimeter of the desk. What is the appropriate unit to measure the perimeter of the desk. Give reasons.

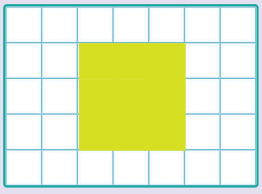
2 Find the perimeter.



..... units



..... units

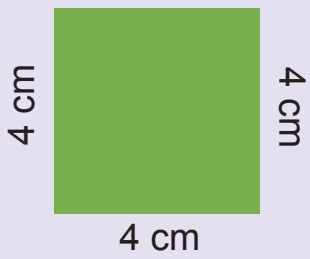


..... units

Perimeter is the distance around a shape.

3 Find the perimeter of the shapes shown below.

a)



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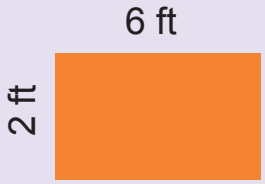
b)



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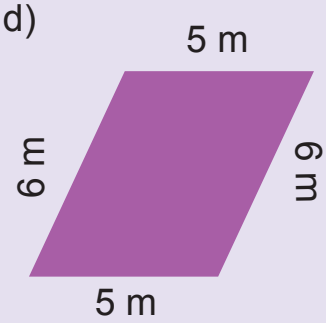
c)

.....

d)



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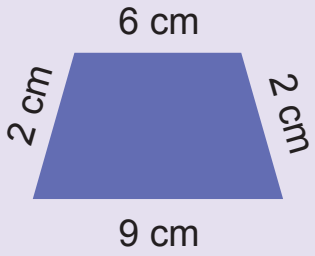
e)



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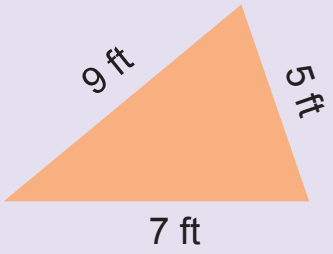
f)



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Perimeter of composite figures

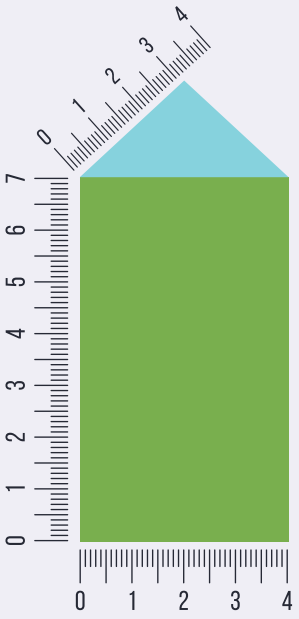
Example 1

Asma and Shuaib draws a house. Asma wants to design the outline of the house using glittery ribbon.
Following is Asma's working to find the total length of ribbon needed.

She uses a centimetre ruler to find the perimeter of the house.

There are two shapes in the house. A triangle and a rectangle. The house is a **composite** figure.

Asma measured the house; length and breadth of the rectangle and two sides of the triangle.



This is Asma's working

Perimeter of the house:
= 7 + 7 + 4 + 3 + 3
= 14 + 6 + 4
= 14 + 10
= 24 cm

Shuaib calculated the perimeter using a different method.

Perimeter of the house
= 2 x 7 + 2 x 3 + 4
= 14 + 6 + 4
= 20 + 4
= 24 cm

Let's investigate

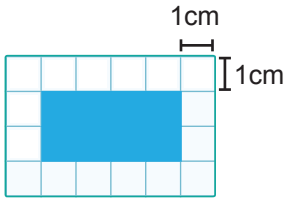
Analyse the methods used by Asma and Shuaib. What are the differences? Which method do you prefer?

Math Language

A composite or compound shape is any shape that is made up of two or more geometric shapes. Draw a composite figure using two or more different shapes.

Exercise 1

1 What is the perimeter of the shaded rectangle?

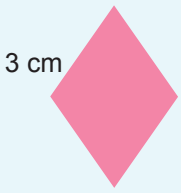


2 Find the perimeter of the following shapes.

A regular pentagon: all the sides are equal in a regular pentagon.

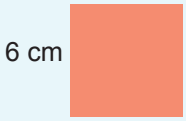
One way: 5 + 5 + 5 + 5 + 5 = ?
Another way: 5 x 5 = ?

A rhombus: All the sides are equal in a rhombus.



One way: 3 + 3 + 3 + 3 = ?
Another way: 4 x 3 = ?

A square: All the sides are equal in a square. Find the perimeter using a method you prefer.



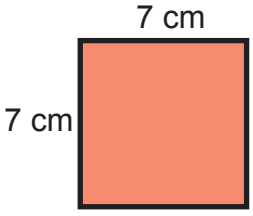
One way: 6 + 6 + 6 + 6 = ?
Another way: 6 x 4 = ?

3 Zara is finding the perimeter of the rectangle.

8 cm + 3 cm = 11 cm

11 x 2 = 22 cm

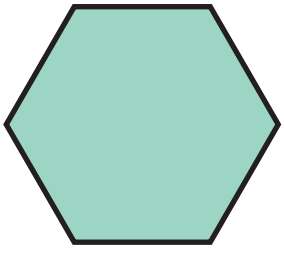
a) Use Zara's method to find the perimeter of the shapes.



Share your thinking

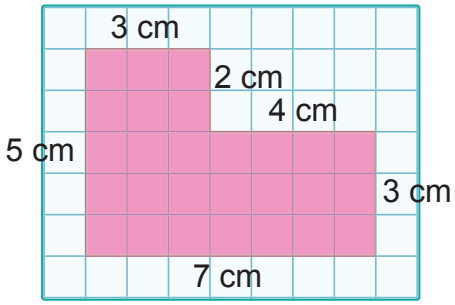
b) Zara says, " If I have to find a perimeter of a square, I multiply the length by 4." Is she correct? Explain your answer.

c) All sides of the hexagon are the same length. Find the perimeter of the hexagon.

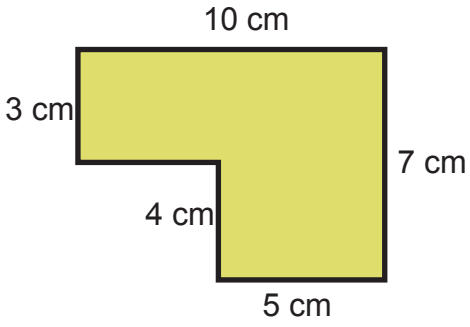


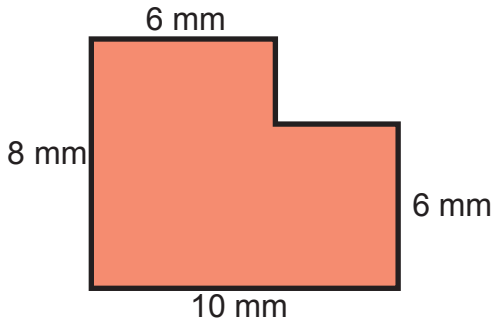
Exercise 2

1 Find the perimeter of the composite figure.

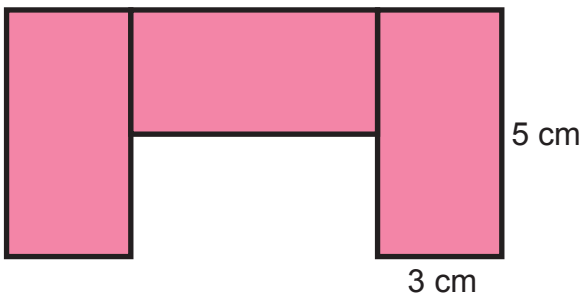


2 Find the perimeter of the composite figures.

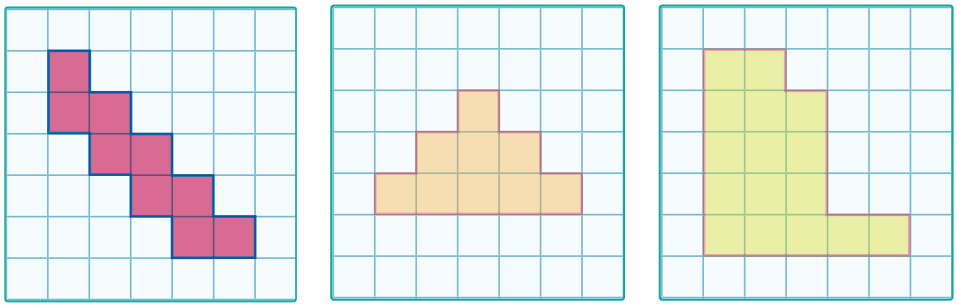




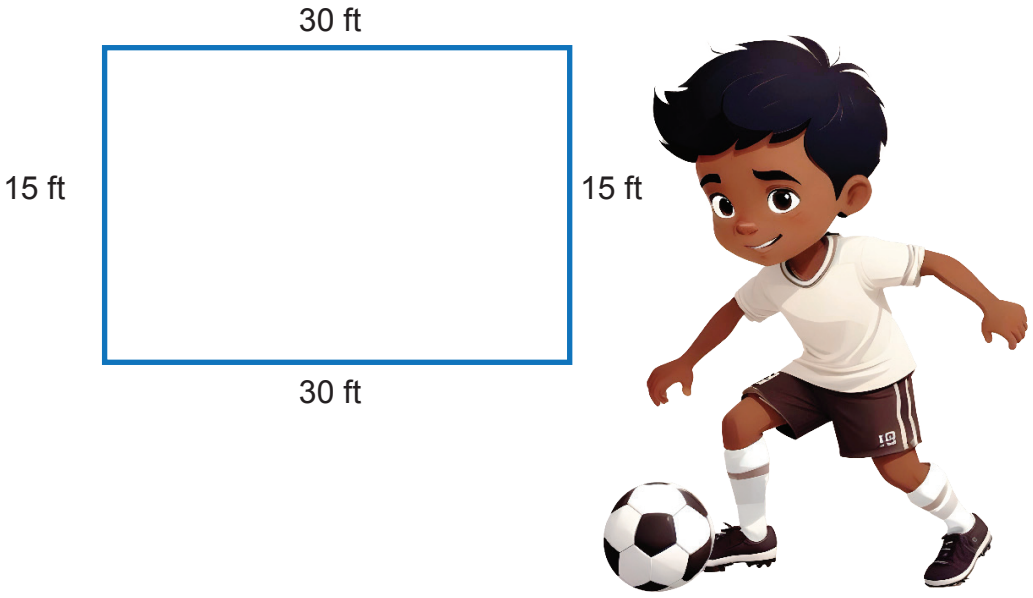
3 The following shape is made of 3 identical rectangles. Find the perimeter of the composite shape.



4 Draw each shape on centimetre square paper. Order the shapes from smallest to largest perimeter.



5 Zimam is roping off an area to play football. The field needs to be 15 ft by 30 ft. How much rope will he need?



Area

Warm up

Materials needed: Math exercise book, pattern blocks

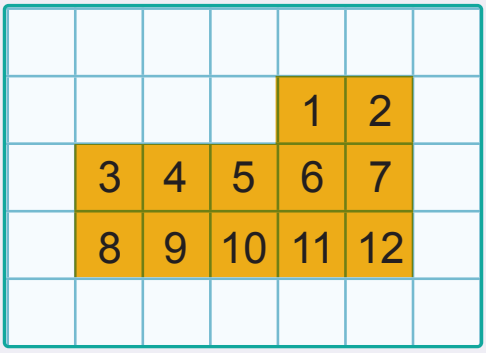
1. Take your Math exercise book and pattern blocks.
2. Estimate how many pattern blocks will cover the surface of the book (Eg: How many squares).
3. Cover the book using blocks. Find its area in Blocks.

Area in square units

Example 1

To find the area of a surface, count the number of square units.

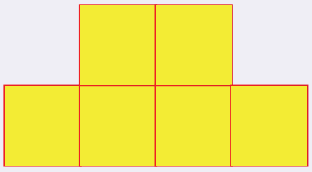
1 cm^2



Area = 12 cm^2

Example 2

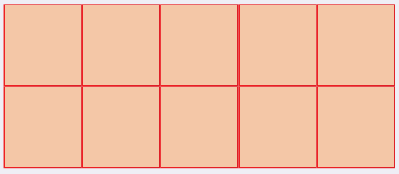
There are 6 squares. Therefore, area of this shape is 6 square units.



Example 3

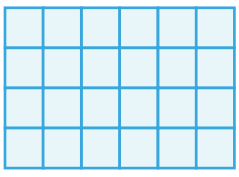
To find the area of a rectangle, you can count the square units or multiply.

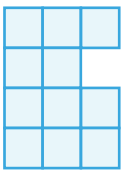
There are 2 rows of 5 squares.
Area = 2 x 5 = 10 square units.

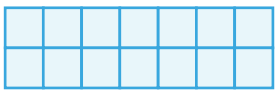


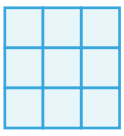
Exercise 3

1 Estimate which shape has the greatest area. Then find the area of each shape in square units.

a) 

b) 

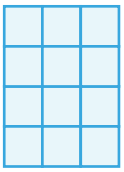
c) 

d) 

2 Compare and write the area of the shapes of question 1 in ascending order.

3 Write a multiplication fact to find the area of each rectangle.

a) 

b) 

c) 

4 Use grid paper. Draw rectangles for the given areas.

a) 12 square units
b) 25 square units

Area in square centimetres and metres

Let's collaborate

Use newspapers, tape, scissors, and a metre stick to find the area of your classroom or a part of your classroom.

a) Use the materials above to make a square with side length 1 m for each group member.
b) Estimate the areas of your classroom, a part of your classroom or school. Then use your metre squares to find the actual area of the selected places..
c) Record your results.
d) Repeat the same activity for centimetre square.

In the first part of the activity, each square you made has an area of one square metre.

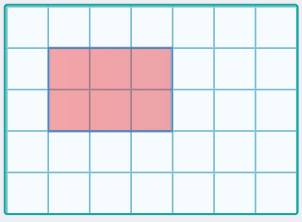
a) Label one square metre as 1 m ^{2}.
b) In the second part of the activity, each square you made has an area of one square cetimetre.
c) Label one square centimetre as 1 cm ^{2}.
d) What is the difference between centimetre square and metre square? Discuss in groups.

Math in Real Life

Example 1

Hawwa wants to grow additional plants in her flower garden. She uses a measuring tape to find the exact area of the free space in the garden.

The length of the garden is 3 m and breadth is 2 m. She draws a model of the free space of the garden on a grid paper to find the area.



Area = 2 x 3 = 6 square metres

Hawwa can plant 25 bulbs in one metre square, so how many bulbs can she plant in 6 square metres?

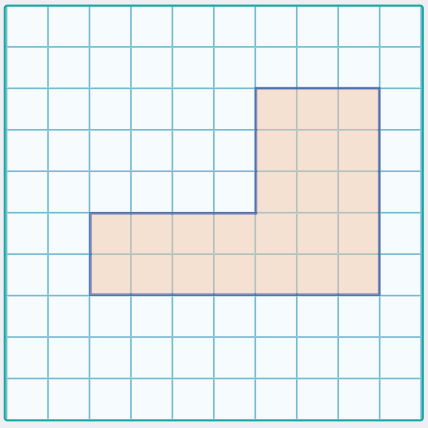
$1\ m^2$	25 bulbs
$6\ m^2$	?

0	1	2	3	4	5	6
0	25	50	75	100	125	150

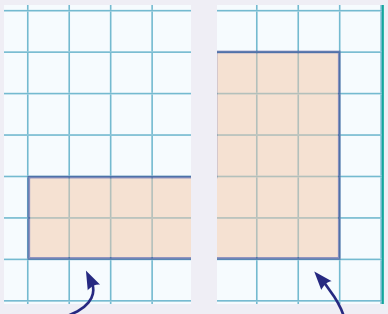
Hawwa can plant 150 bulbs in 6m ².

Example 2

Find the area of the composite figure.



This is a composite figure made of rectangles.



There are 2 x 4 square units.

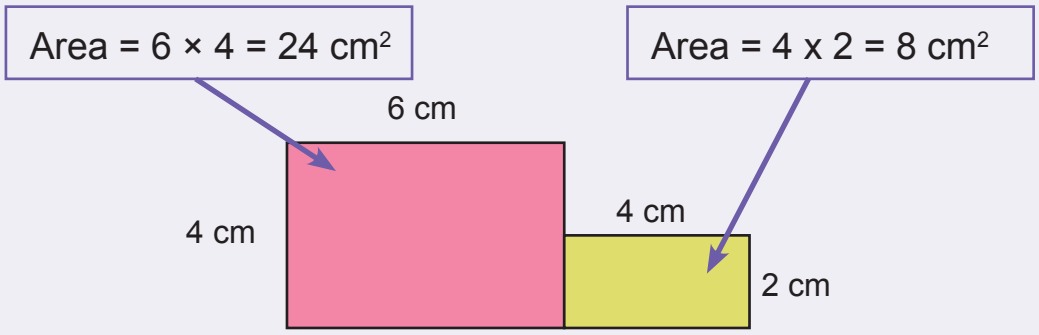
There are 5 x 3 square units.

Altogether, area of the composite shape is

8 + 15 = 23 square units.

Example 3

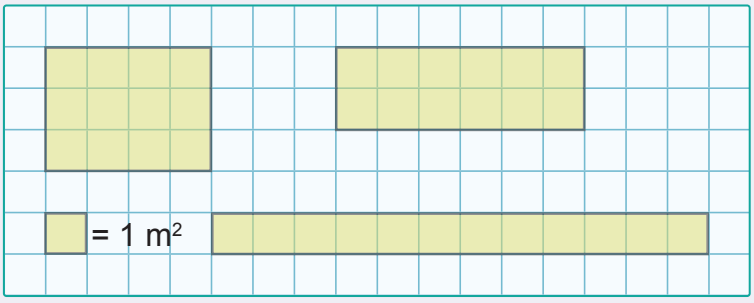
Find the area of the following composite figure.



The total area of this shape is 24 cm^2 + 8 cm^2 = 32 cm^2.

Example 4

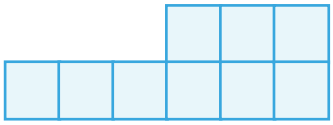
Find three possible ways to draw rectangles with equal areas.
Each rectangle below has area of 12 m^2.



Exercise 4

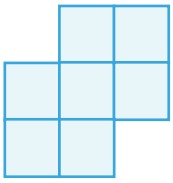
1 Find the area of the following figures.

a)



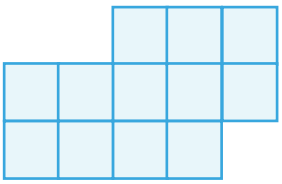
Area = ... square cm

b)



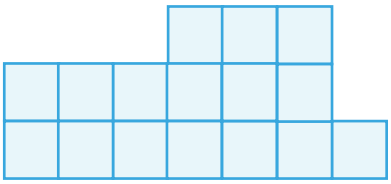
Area = ... square cm

c)



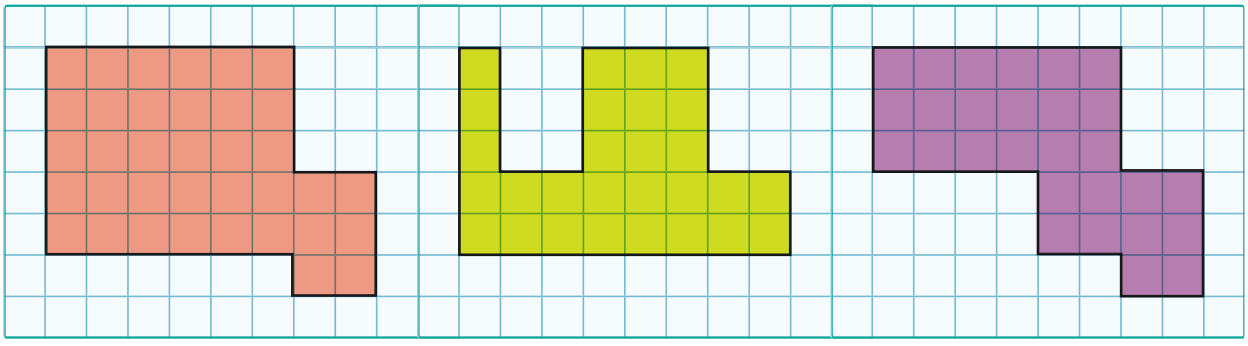
Area = ... square cm

d)



Area = ... square cm

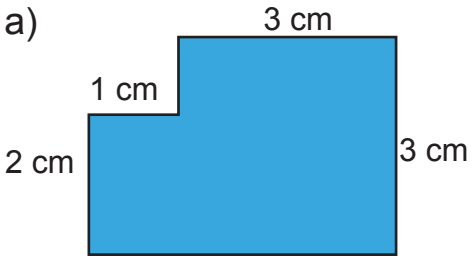
2 Find the area of the following composite figures.



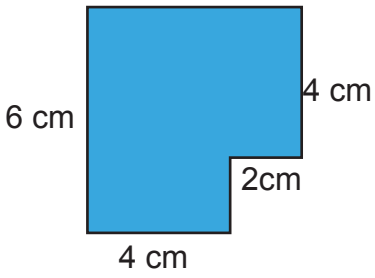
Area = ... cm^2 Area = ... cm^2 Area = ... cm^2

3 Find the area of the composite figures.

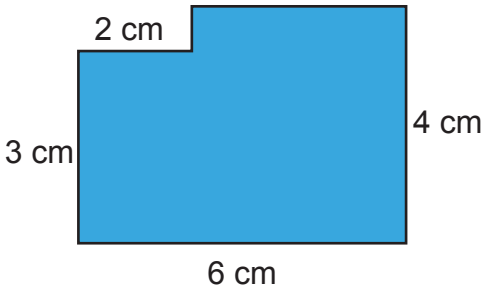
a)



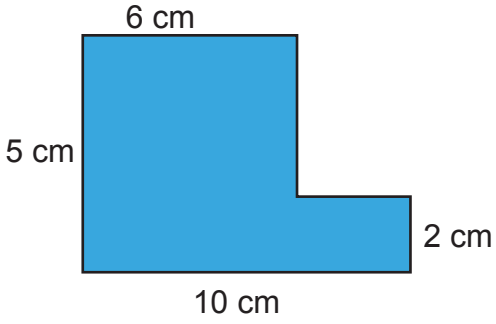
b)



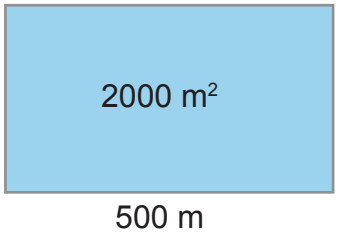
c)



d)



4 The area of a rectangular park is 2000 m². If the length of the park is 500 m, what is the width?



Area of rectanglular park = 500 x ..... = 2000 m²

Define the mathematical terms on your own words. Give examples for each term.

Math Language

- Area
- Perimeter
- Composite shapes
- Boundary
- Quadrilateral

5 Which of these objects do you think would have an area of about 1 m^2 ?

a) Table top
b) Football field
c) Text book
d) A4 paper

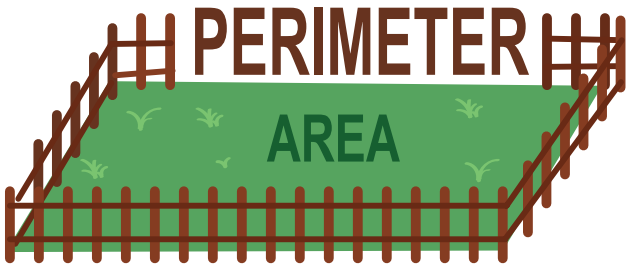
Do you remember the squares you made in metres and centimetres?
Use it as a benchmark to estimate the area. Think about how many of it will cover the surface.

Let's investigate

a) Draw a shape which has a greater perimeter than area.
b) Draw a shape that has the same area and perimeter.
c) Draw a shape that has a greater area than perimeter.
d) How many ways can you draw a rectangle whose perimeter is 24 cm?

Share your thinking

e) How is finding the perimeter different from finding the area? Explain.



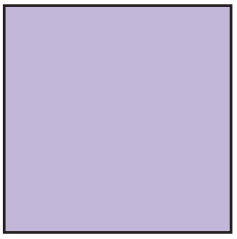
6 Laila is designing a rectangular playground. The area of the available space is 48 cm^2.

a) What could be the possible measurements of the rectangular playground?
b) Draw all the possible rectangles.
c) Which rectangle would you recommend to Laila? Explain your choice.

Put your thinking cap on

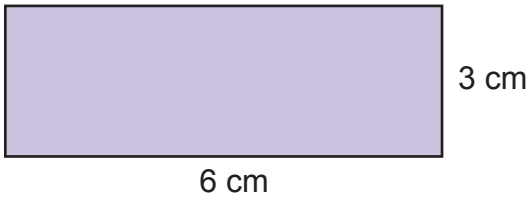
1. When all the sides of a rectangle are odd numbers, the perimeter is even. Prove it.

2. Here is a square. Each side of the square is given in centimetres. Which of these lengths could be the perimeter of the square?
24 cm, 34 cm, 44 cm, 54 cm, 64 cm, 74 cm.

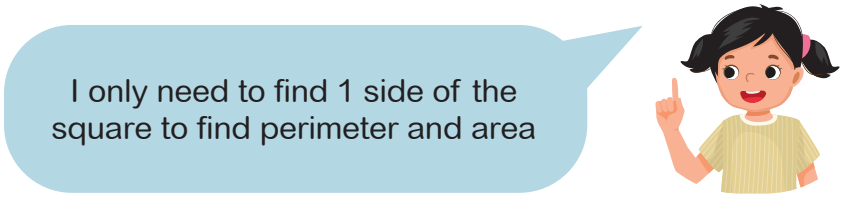


Why could the other values not be the perimeter? Explain.

3. Salma is measuring the shape below. She thinks the perimeter is 9 cm. Do you agree with Salma? Prove your thinking.

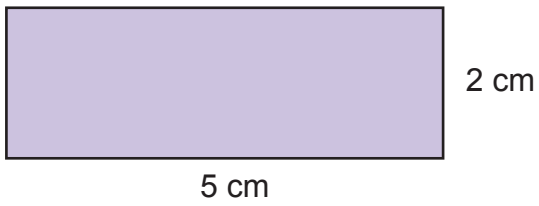


4. Zeeba is measuring the perimeter and area of a square.

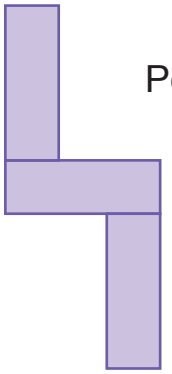


Do you agree with Zeeba? Explain why. Use an example to prove your point.

5 Zubair has some rectangles. The size of all rectangles are same.

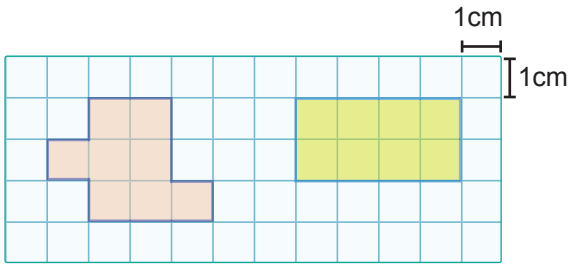


He makes this composite shape using his rectangles. What is the perimeter of the composite shape?

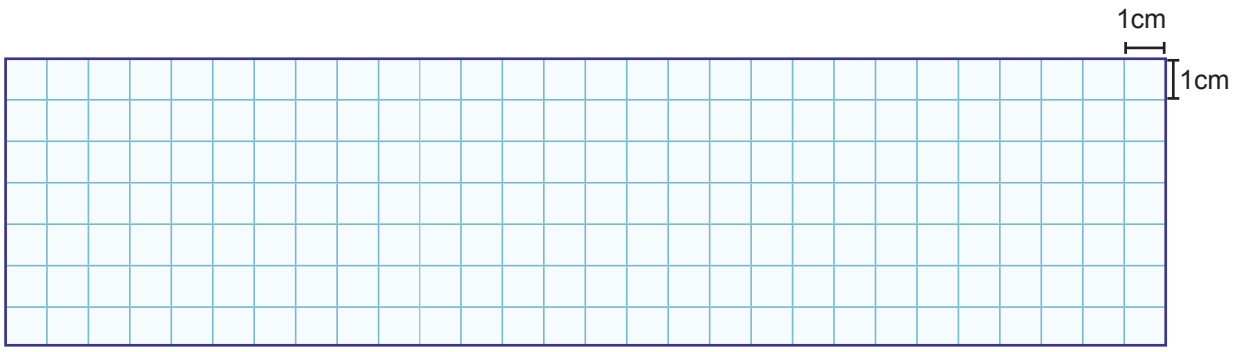


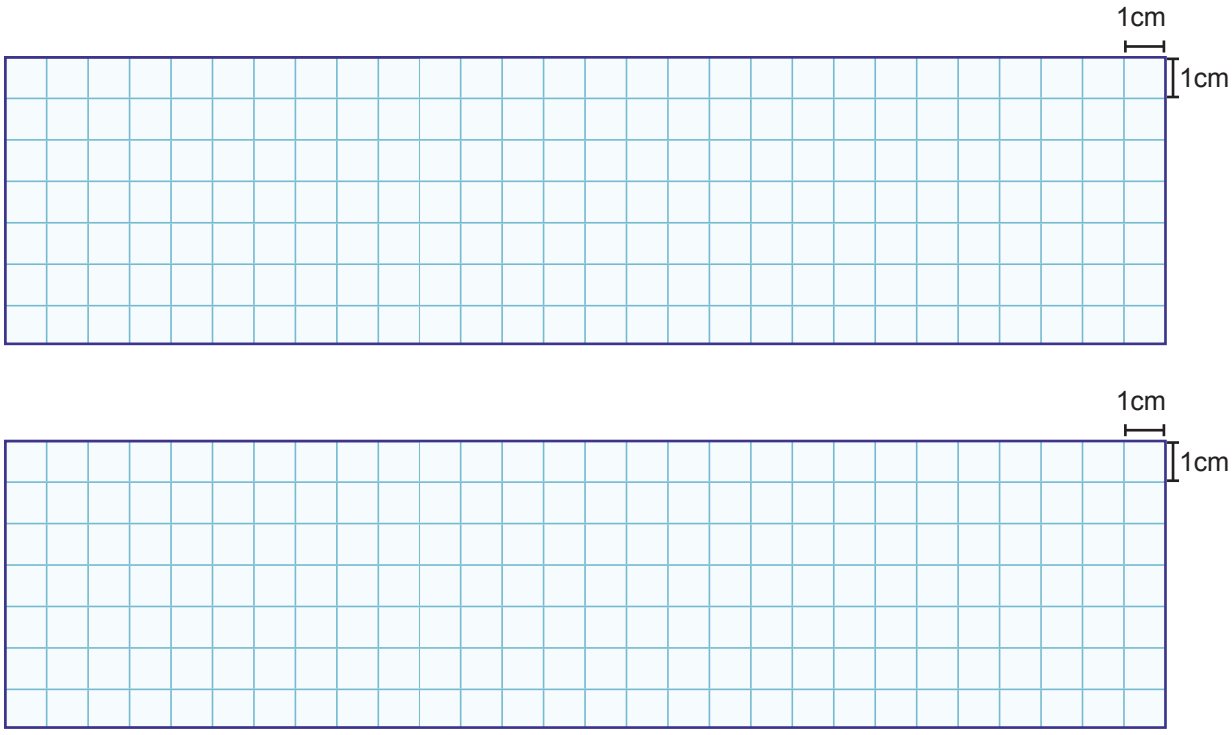
Perimeter = ...

6 Rugiyya thinks these shapes have the same area. Do you agree? Explain why?

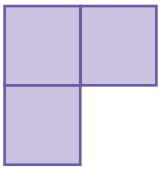


7 Draw 3 different rectangles, each with a perimeter of 16 cm.





8 The composite shape is made up of three squares. The area of each square is 36 cm^2. What is the perimeter of the composite shape?



Let's collaborate

1 a) In groups, discuss the importance of choosing appropriate units to measure length, perimeter and area.

b) Discuss the units you would use to measure the following.

i) The length of the span of your hand
ii) The thickness of a notebook
iii) The distance from Male' to Hulhumale'.
iv) The area of a school compound

2 Discuss and answer the following questions in groups.

Without using any measuring tools, draw 2 shapes that are about 30 cm^2 in area.

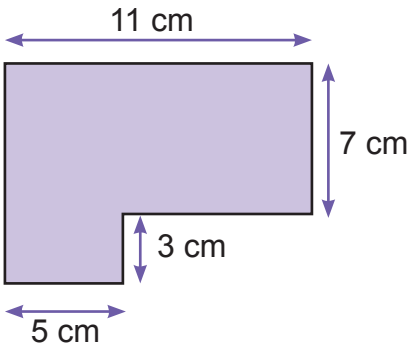
Find an object in the room that has about twice the area as your exercise book.

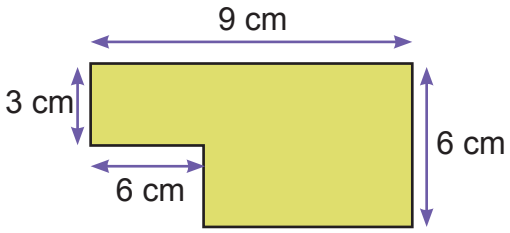
Estimate the area of your desk.

About how many square sticky notes would it take to to cover your table?

Self assessment

1 Find the area and perimeter of the shapes.

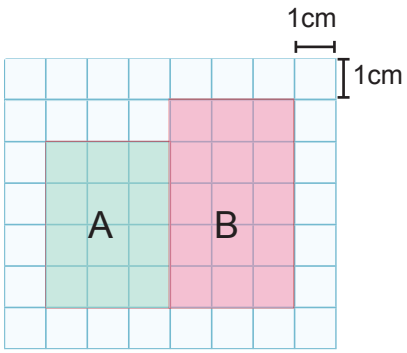




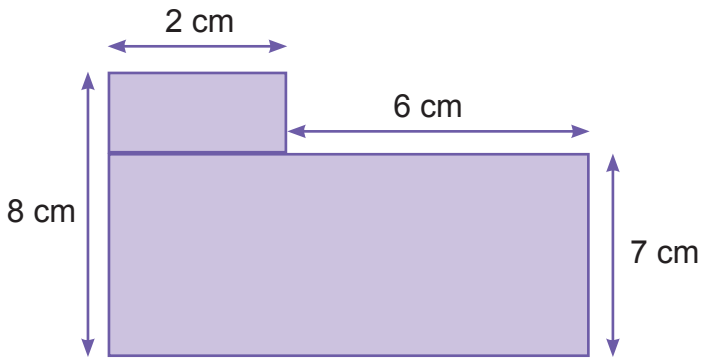
2 The area of a rectangle is 40 square units. The rectangle has 10 rows of squares. How many squares are in each row?
How do you know?

3 A compound shape is made up of two rectangles, A and B

a) Find the area of rectangle A.
b) Find the area of rectangle B.
c) What is the area of the composite shape?



4 Here is a shape made of two rectangles. What are the perimeter and the area of the shape?



Perimeter = ...

.....

.....

.....

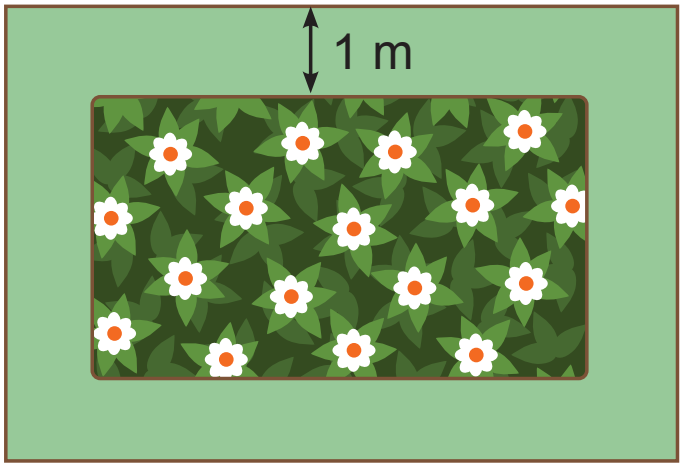
Area = ...

.....

.....

.....

5 A rectangular flower bed is 5 m long and 3 m wide. The path around the flower bed is 1 m wide.



a) What is the perimeter of the flower bed?

b) What is the perimeter of the outside of the path?

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

I am good at ……

The mistakes I did are ……..

What I learned from my mistakes are ……..

Unit 13

Time

I will learn to:

- Read and use 24-hour clock.
- Convert times between 12-hour clock and 24-hour clock.
- Construct timelines.
- Convert time between hours, minutes and seconds.

Warm up

Math teaches me time management.

For example, I schedule the time spent on activities like playing, reading, school hours, studying and so on. I reflect on my schedule and adjust it by giving more time to focus on the areas where I need improvement.

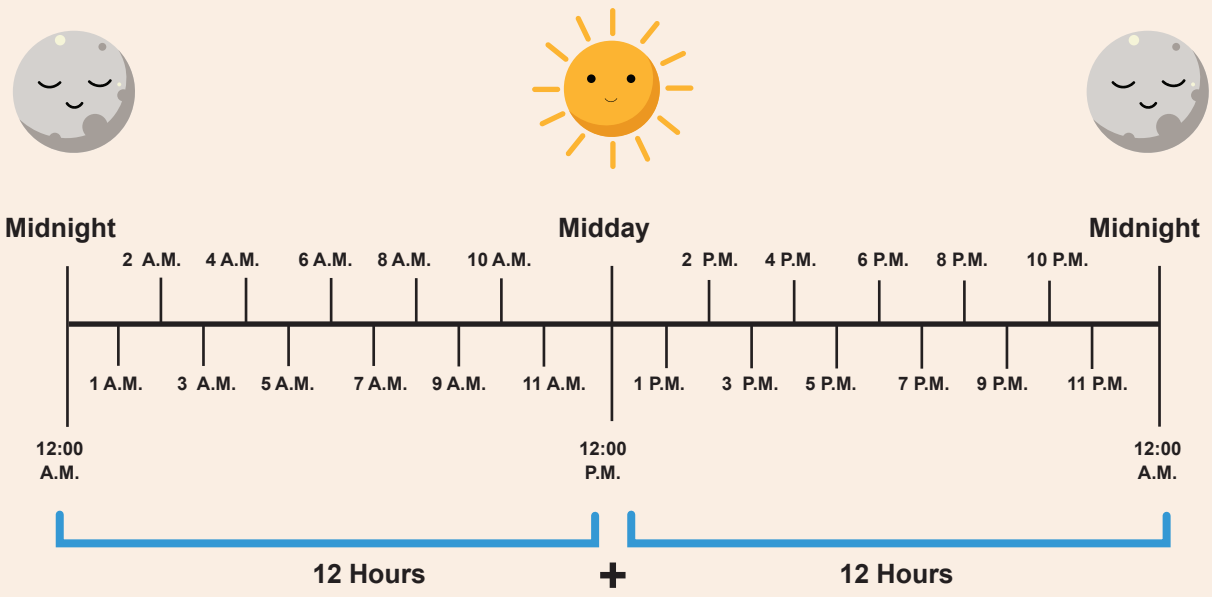
In grade 3, you have learned how to use a.m and p.m.

The purpose of using a.m. and p.m. is to identify the first half of the day and the second half of the day.

What do you do in the first half of the day?
What do you do in the second half of the day?

Math in Real Life

Write your daily activities. Write time of the activities using a.m. and p.m.



24-hour clock

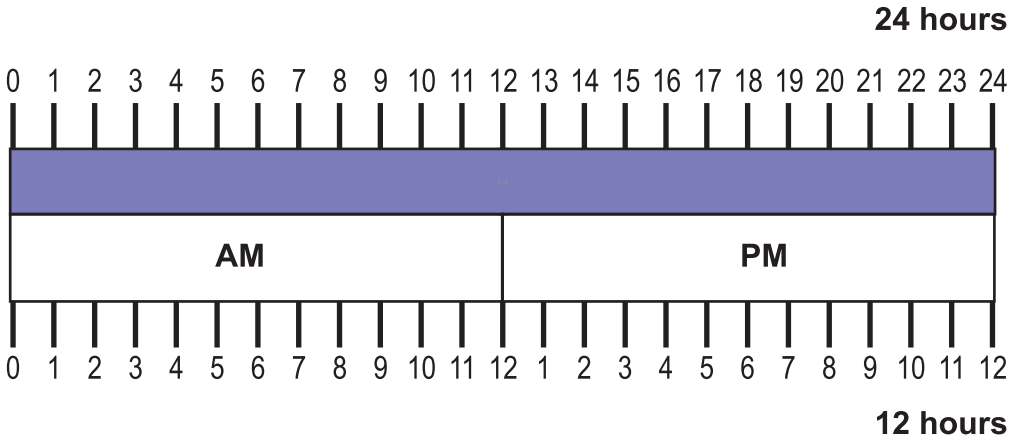
This is Ali's flight schedule from Male' to Singapore.

MLE 23 25 Male' 20 Jul (Sat)	✈	**SIN 07 05** Singapore 21 Jul (Sun)

Ali's flight time is written using 24-hour clock.

Let's investigate

The following number line shows the difference between 12-hour time and 24-hour time.



What is Ali's departure time? Is it morning, afternoon, evening or night?
What is Ali's arrival time? Is it morning or night?

There are 24 hours in one day. From midnight to noon, the hours are from 0 to 12. From 1 o'clock to midnight, the hours are from 13 to 00. When we use the 24-hour clock, we use 4-digits to write the time.

Example 1

Hassan wants to meet Yoosuf. Yoosuf says he is free at 9 o'clock. Hassan wants to know if he meant 9 a.m. or 9 p.m.

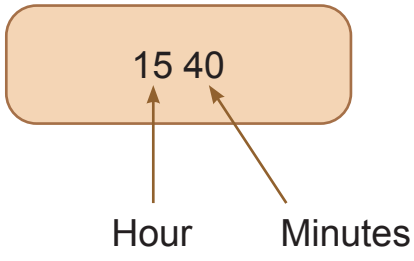
Do you come across such situations where you want to clarify more about time?

In 24 hour clock, we do not use A.M. or P.M.

9 a.m. in 24-hour clock is 09 00.

9 p.m. in 24-hour clock is 21 00.

In 24 hour clock, the first two digits stand for hours and the last two digits stand for minutes.



It is read as "fifteen forty".

Changing between the 12-hour and 24-hour clocks

- 24-hour times are always written using four digits.

General rules for converting times between 12-hour and 24-hour clock

12-hour clock to 24-hour clock	24-hour clock to 12-hour clock
• From 12 midnight to 12:59 a.m., subtract hours and remove "a.m". Eg: 12:30 a.m is 00 30.	• From 00 00 to 00 59, add 12 hours and write "a.m.". Eg: 00 30 is 12:30 a.m.
• From 1:00 a.m to 12:59 p.m., remove "a.m". or "p.m." and write the time using four digits. Eg: 8:30 a.m. is 08 30.	• From 01:00 to 12:59, write "a.m." or "p.m.". Eg: 08 30 is 8:30 a.m.
• From 1:00 p.m. to 11:59 p.m., add 12 hours and remove "p.m.". Eg: 11:30 p.m. is 23 30.	• From 13 00 to 23 59, subtract 12 hours and write "p.m.". Eg: 19 30 is 7:30 p.m.

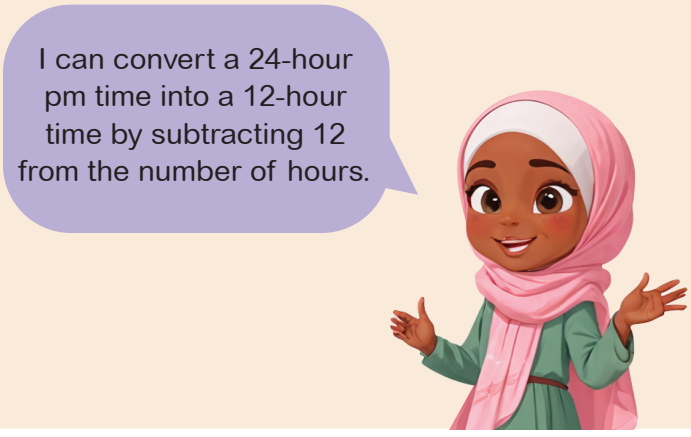
12-hours	24-hours
12:00 AM	00 00
12:30 AM	00 30
1:00 AM	01 00
2:00 AM	02 00
3:00 AM	03 00
4:00 AM	04 00
5:00 AM	05 00
6:00 AM	06 00
7:00 AM	07 00
8:00 AM	08 00
9:00 AM	09 00
10:00 AM	10 00
11:00 AM	11 00
12:00 PM	12 00
1:00 PM	13 00
2:00 PM	14 00
3:00 PM	15 00
4:00 PM	16 00
5:00 PM	17 00
6:00 PM	18 00
7:00 PM	19 00
8:00 PM	20 00
9:00 PM	21 00
10:00 PM	22 00
11:00 PM	23 00

Example 1

Write 15 52 in 12-hour clock.

The time on the clock is eight minutes to 4. This is the same as fifty-two minutes past 3. This is a p.m. time.

15 - 12 = 3
15 52 = 3:52 p.m.



Example 2

Shifau arrived at the theatre at 11 45 and left at 14 20. How long did he spend in the theatre?

Count on to find the time.

11 45 to 12 00 is 15 min.

12 00 to 14 00 is 2 h

14 00 to 14 20 is 20 min

Total time: 15 min + 2 h + 20 min = 2 h 35 min

Let's collaborate

In groups, discuss the above tables and convert the following a.m. and p.m. times to 24-hour clock.

12:15 a.m.	01:35 a.m.	02:20 a.m.	03:48 a.m.	04:10 a.m.	05:39 a.m.	06:11 a.m.	07:59 a.m.	08:49 a.m.	09:25 a.m.	10:26 a.m.	11:40 a.m.	a.m, p.m. clock
												24-hr clock

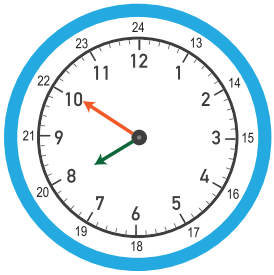
12:15 p.m.	01:11 p.m.	02:06 p.m.	03:17 p.m.	04:50 p.m.	05:31 p.m.	06:40 p.m.	07:58 p.m.	08:15 p.m.	09:55 p.m.	10:21 p.m.	11:59 p.m.	a.m, p.m. clock
												24-hr clock

Exercise 1

1. How is your sense of time? Guess what time it is right now. Check the time. How close was your guess?

2. Write time using 24-hour clock.

P.M.

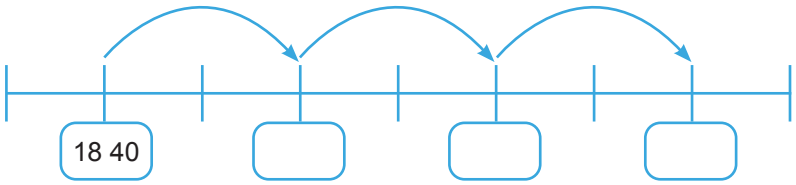


P.M.

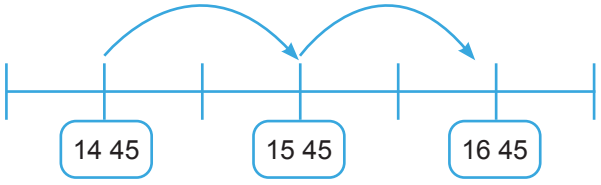
P.M.

A.M.

3 Fayaz went to the airport 3 hours prior to the boarding time. If he arrived the airport at 18 40, What was his boarding time?



4 Nilma started watching TV at 14 45 and stopped at 16 30. How long did she watch TV?



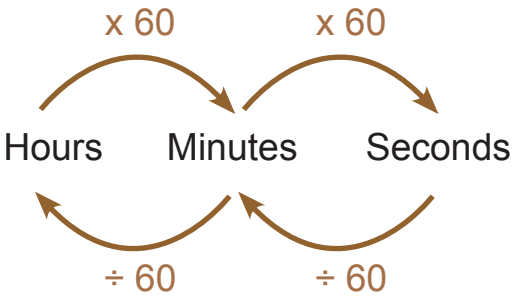
5 Write your daily (week days) schedule using a.m. and p.m and then convert the times to 24-hour clock.

6 a) Write 5 prayer times of today using a.m. and p.m and then convert the times to 24-hour clock.
b) In groups, discuss the benefits of praying Salah on time.

7 Would you measure the activities in seconds, minutes or hours?

brushing teeth	reading a book	saying the alphabet
travelling on a plane	playing outside	sleeping at night

Converting time between hours, minutes and seconds



Remember! In conversion of units, from larger to smaller units, you used multiplication, while smaller to larger units you used division.

Example 1

1 hour	2 hour	3 hour
60 minutes	2 x 60 = 120 minutes	3 x 60 = 180 minutes

Example 2

1 minute	2 minute	3 minute
60 seconds	2 x 60 = 120 seconds	3 x 60 = 180 seconds

Example 3

Which time do you think is shortest? Why?

600 seconds

9 minutes

$\frac{1}{4}$ of an hour

In the question, the times are given in 3 different units. In order to compare the given times, we need to convert it into same units.

Firstly, we know that quarter or $\frac{1}{4}$ of an hour is 15 minutes.

600 seconds	9 minutes	15 minutes

Now, let's convert 600 seconds into minutes.

Seconds ⟶ minutes; to convert from smaller to larger unit, we have to use division.

600 ÷ 60 = ? how many 60s are there in 600?

60 x 1 = 60
60 x 2 = 120
60 x 3 = 160
60 x 4 = 240
60 x 5 = 300
60 x 6 = 360
60 x 7 = 420
60 x 8 = 480
60 x 9 = 540
60 x 10 = 600

There are 60 seconds in 1 minute

600 ÷ 60 = 10

There are ten 60s in 600.

600 seconds	9 minutes	$\frac{1}{4}$ of an hour
10 minutes	9 minutes	15 minutes

Therefore, the shortest time is 9 minutes.

Exercise 2

1 Show how you can use 6 times-table facts to help convert times.

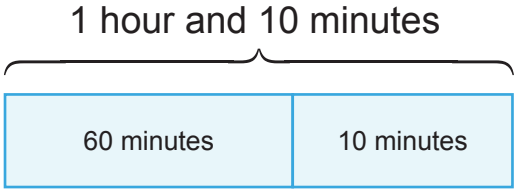
1 × 6 = ☐	1 × 60 = ☐	1 hour = ☐ minutes
2 × 6 = ☐	2 × 60 = ☐	☐ hours = ☐ minutes
3 × 6 = ☐	3 × 60 = ☐	☐ hours = ☐ minutes
4 × 6 = ☐	4 × 60 = ☐	☐ hours = ☐ minutes
10× 6 = ☐	10× 60 = ☐	☐ hours = ☐ minutes

2 Complete the equivalence tables.

Hours (hr)	Minutes (min)
1	60
$1\frac{1}{2}$	
4	
6	

Minutes (min)	Seconds (s)
1	60
$1\frac{1}{2}$	
4	
6	

3 Jumana draws a bar model to work out how many minutes are in 1 hour and 10 minutes.



Use Jumana's method to work out how many minutes are in:

a) 1 hour and 20 minutes .....

b) 1 hour and 35 minutes .....

c) 1 hour and 5 minutes .....

d) 1 hour and 40 minutes .....

4 A group of students are washing cars for charity. They can wash one car in 10 minutes. How many cars can they wash in one and half hours?

Step 1: convert 1 and half hours to minutes.

Step 2: find the number of cars they can wash in ..... minutes.

5 Zubaidha goes to bed at 8 o'clock every night. She gets up at 5 o'clock every morning.

a) How many hours does Zubaidha sleep?

b) How many hours does Zubaidha spend on activities other than sleeping?

When do you go to bed? Discuss the benefits of sleeping early and waking up early.

Share your thinking

c) How did you work out the answers of part (a) and (b).

6 Hamid went for a 50-minute run. How many seconds did Hamid run?

7 Rabeea made a sand castle in 540 seconds. How many minutes did it take Rabeea to build the sand castle?

Math Language

Explain the differences between 12-hour clock time and 24-hour clock to your friends. Use examples to elaborate your explanation.

Put your thinking cap on

1

I know how to convert 7:28 a.m. to 24-hour time! I've to add 12 to the number of hours. The answer is 19 28.

Explain Malaka's mistake. How would you convert 7:28 am into a 24-hour time?

2

There are 60 minutes in an hour.

There are 60 seconds in a minute.

That means there are 120 seconds in an hour.

Do you agree with Namra? Prove your answer.

3

360 seconds is the same as 3 minutes and 60 seconds.

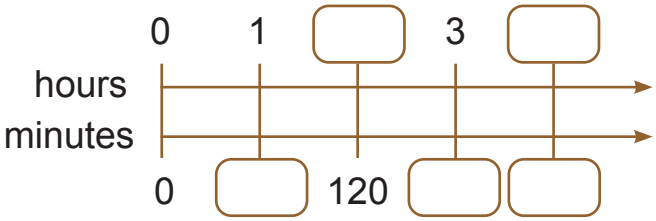
Do you agree with Ahmed? Show your working.

4 Here are 2 clocks. How much faster is the one on the right?

5 Sobira needs to catch a bus at 19 06. She looks at her watch. How long has she got before the bus is due to depart?

Self assessment

1 Complete the double number line.



2 Sam is boiling an egg. She wants to boil it for $4\frac{1}{2}$ minutes, but she accidentally boils it for an extra 45 seconds. In total, how many seconds does she boil the egg for?

$4\frac{1}{2}$ minutes	45 seconds
..... seconds	

3 Ahmed and Umair are working on a puzzle. Ahmed completes the puzzle in 3 minutes and 17 seconds. He draws a bar model to convert 3 minutes and 17 seconds into seconds.

60 + 60 + 60 + 17 = 197
so 3 minutes and 17 seconds = 197 seconds.

Umair completed the puzzle in 2 minutes and 15 seconds. Help him convert 2 minutes and 15 seconds into seconds using Ahmed's model.

4 How long in minutes do you think it will take you to write numbers from 0 to 100? Fill in the chart. Make a note of the starting time and finishing time. Were you accurate? What was the difference?

Estimated time	Starting time	Finishing time	Difference

5 Are the units of time sensible for each activity? Write YES or NO.

a) Length of a netball match in seconds.
b) Length of Math period in minutes.
c) Length of reading a novel in days.
d) Length of school prize day ceremony in minutes.

Let's reflect

In this unit, I learned ……

I will use these skills in real life situations such as ……

New strategies I learned are ……

New words I learned are ……

The exercise/activity that helped me to learn the most is ……

I am good at ……

The mistakes I did are ……

What I learned from my mistakes are ……

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