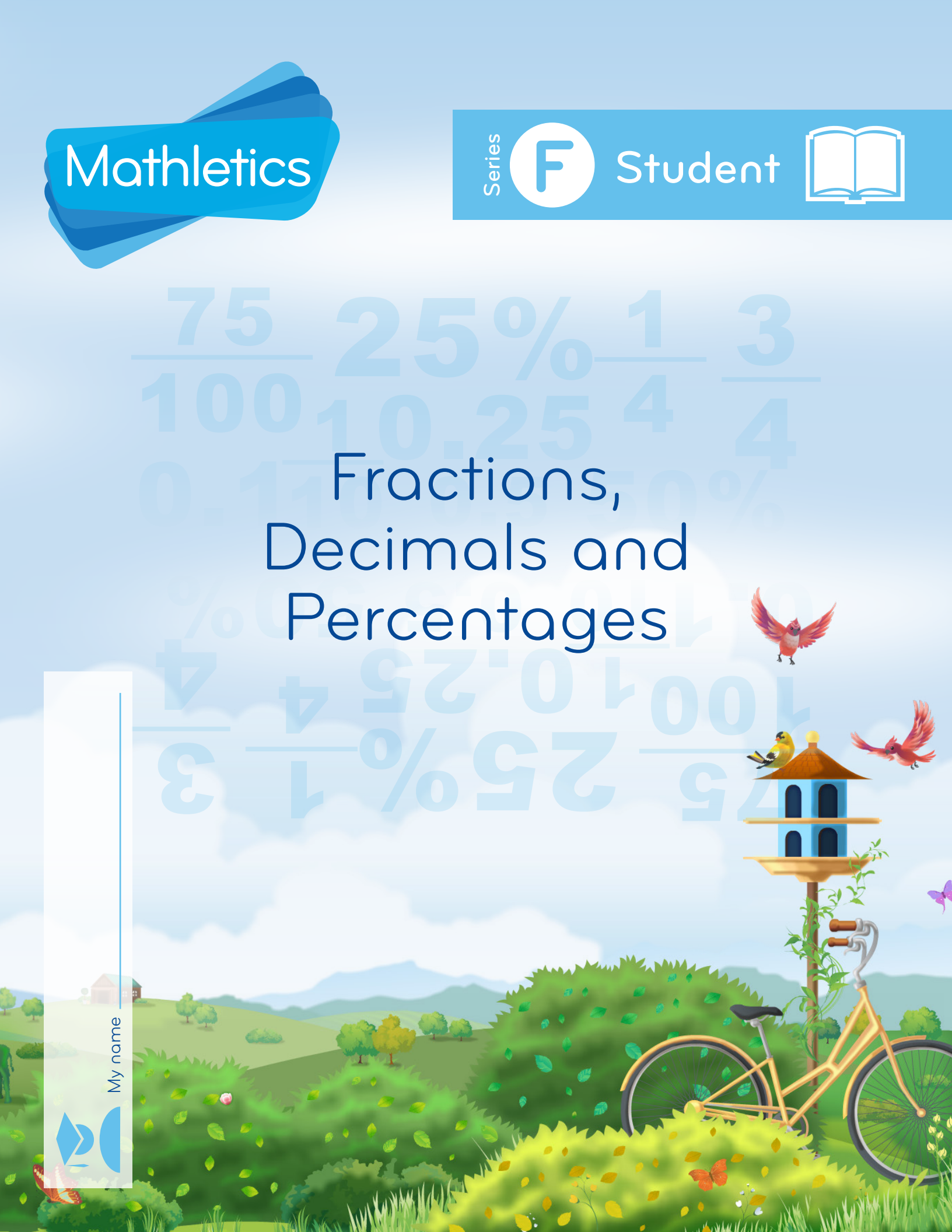
Mathletics

Series F Student

Fractions, Decimals and Percentages



My name

First edition printed 2009 in Australia.

A catalogue record for this book is available from 3P Learning Ltd.

ISBN 978-1-921860-79-9

Published 3P Learning Ltd

For more copies of this book, contact us at: www.3plearning.com/contact

Designed 3P Learning Ltd

Series F – Fractions, Decimals and Percentages

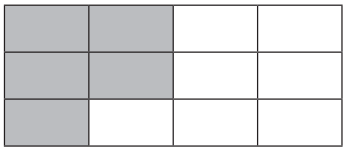
Contents

Series Authors:

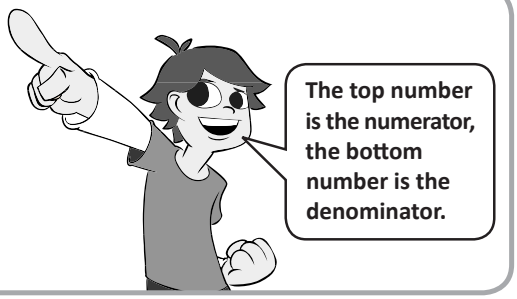
Rachel Flenley
Nicola Herringer

Fractions – fractions of shapes

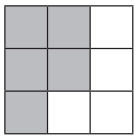
A fraction is a part of a whole.
This shape has 12 equal parts. 5 of these have been shaded.

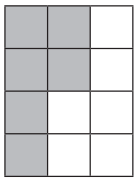


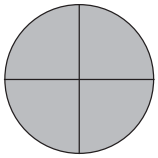
$$\frac{5}{12} = \frac{\text{5 shaded parts}}{\text{12 parts altogether}}$$

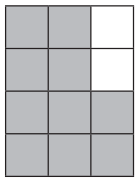


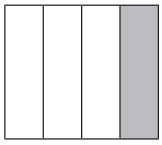
1 **What fraction of each shape has been shaded?**

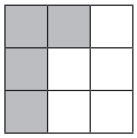
a $\frac{\square}{9}$ 

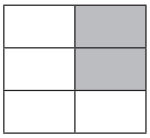
b $\frac{\square}{\square}$ 

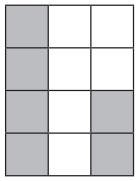
c $\frac{\square}{\square}$ 

d $\frac{\square}{\square}$ 

e $\frac{\square}{\square}$ 

f $\frac{\square}{\square}$ 

g $\frac{\square}{\square}$ 

h $\frac{\square}{\square}$ 

2 **Answer the following questions about the shapes above:**

a What part of **a** is **unshaded**? $\frac{\square}{\square}$

b What fraction of **e** is **unshaded**? $\frac{\square}{\square}$

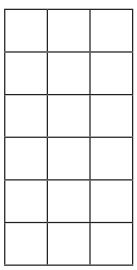
c In **f**, is more of the shape shaded or unshaded? _____

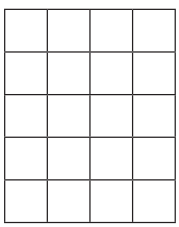
d What fraction of **b** is **unshaded**? $\frac{\square}{\square}$

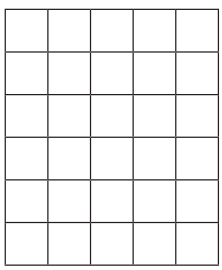
e Look at shape **h**. What can you say about the amount of shaded and unshaded parts?

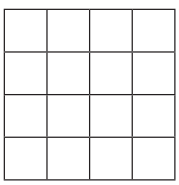
_____

3 **Shade the given fraction for each shape:**

a $\frac{8}{18}$ 

b $\frac{17}{20}$ 

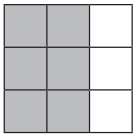
c $\frac{12}{30}$ 

d $\frac{12}{16}$ 

Fractions – fractions of shapes

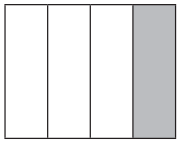
4 **Are these statements true or false?**

a



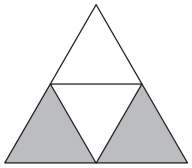
$\frac{6}{9}$ is shaded

b



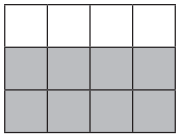
$\frac{1}{4}$ is shaded

c



$\frac{1}{3}$ is shaded

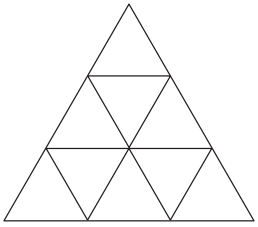
d



$\frac{7}{12}$ is shaded

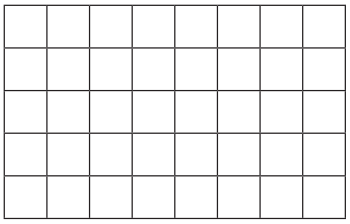
5 **Colour the shapes to show:**

a



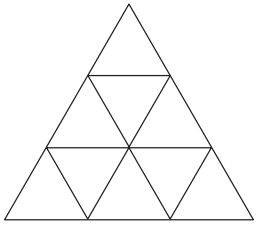
one third

b



one quarter

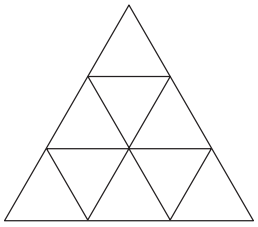
c



two thirds

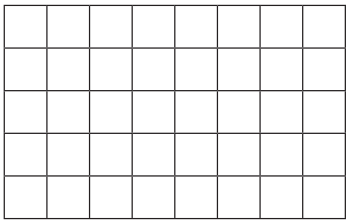
6 **Now find another way to colour the shapes to show the same fraction:**

a



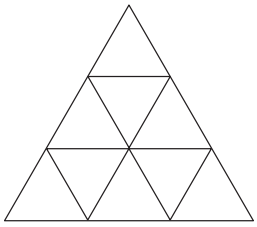
one third

b



one quarter

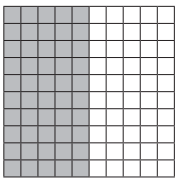
c



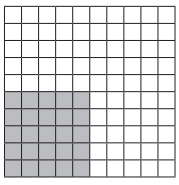
two thirds

7 **What fraction of each hundred square is shaded?**

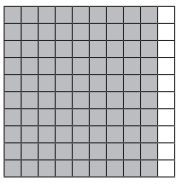
a



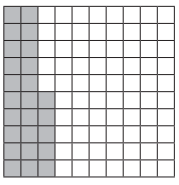
b



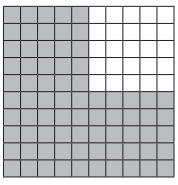
c



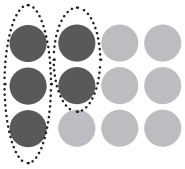
d



e



Fractions – fractions of a collection

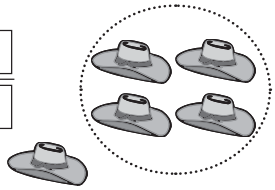


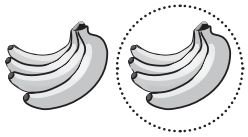
We can also have fractions of groups.

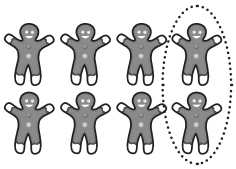
This is a group of 12 dots. 5 out of the 12 dots are circled.

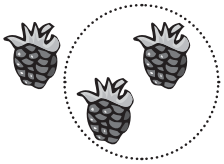
We express this as $\frac{5}{12}$

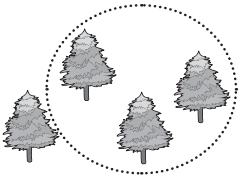
1 **What fraction of each group has been circled?**

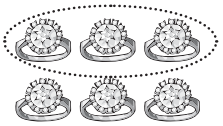
a $\frac{\square}{\square}$ 

b $\frac{\square}{\square}$ 

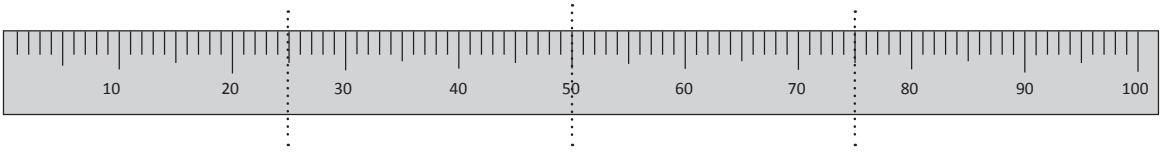
c $\frac{\square}{\square}$ 

d $\frac{\square}{\square}$ 

e $\frac{\square}{\square}$ 

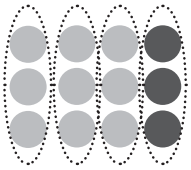
f $\frac{\square}{\square}$ 

2 **Look at the metre ruler and work out how many centimetres are represented by the fraction:**



a $\frac{1}{4}$ m = ☐ cm **b** $\frac{1}{2}$ m = ☐ cm **c** $\frac{3}{4}$ m = ☐ cm

Sometimes we are asked to find the fraction of an amount such as:



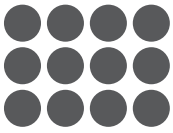
Find one quarter of this array.

There are 12 dots in the array.

First we divide the array into 4 equal parts.

There are 3 dots in each part or quarter so one quarter of 12 is 3.

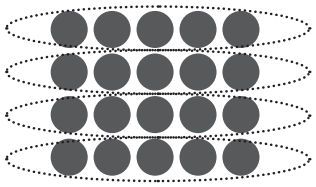
3 **Use the arrays to help find the given fractions of the groups:**

a $\frac{1}{3}$ of this array is _____ dots  $\frac{1}{6}$ of this same array is _____ dots

b $\frac{1}{4}$ of this array is _____ dots  $\frac{1}{6}$ of this same array is _____ dots

Fractions – fractions of a collection

There is another way to find fractions of amounts:
What is $\frac{1}{4}$ of 20?
20 divided into 4 groups is 5 in each group
20 ÷ 4 = 5



4 **Find the fractional amounts. You can use blocks or counters to help or solve the problems in your head using division:**

a $\frac{1}{5}$ of 20 = ☐
20 ÷ ___ = ☐

b $\frac{1}{4}$ of 12 = ☐
12 ÷ ___ = ☐

c $\frac{1}{3}$ of 18 = ☐
18 ÷ ___ = ☐

d $\frac{1}{6}$ of 18 = ☐
18 ÷ ___ = ☐

e $\frac{1}{5}$ of 15 = ☐
___ ÷ ___ = ☐

f $\frac{1}{9}$ of 27 = ☐
___ ÷ ___ = ☐

g $\frac{1}{2}$ of 14 = ☐
___ ÷ ___ = ☐

h $\frac{1}{7}$ of 21 = ☐
___ ÷ ___ = ☐

Once we know how to find one part of a group, we can use this to find other amounts:

To find $\frac{2}{3}$ of 9, we first find $\frac{1}{3}$ of 9 → 9 ÷ 3 = 3 $\frac{1}{3}$ of 9 = 3

$\frac{2}{3}$ of 9 is 2 times this → 2 × 3 = 6 $\frac{2}{3}$ of 9 = 6

5 **Find the fractional amounts. Use the space below to work out the different steps:**

a What is $\frac{2}{5}$ of 20?
20 ÷ 5 = ☐
2 × _____ = ☐
$\frac{2}{5}$ × 20 = ☐

b What is $\frac{3}{4}$ of 12?
12 ÷ 4 = ☐
3 × _____ = ☐
$\frac{3}{4}$ × 12 = ☐

c What is $\frac{2}{3}$ of 18?
18 ÷ 3 = ☐
2 × _____ = ☐
$\frac{2}{3}$ × 18 = ☐

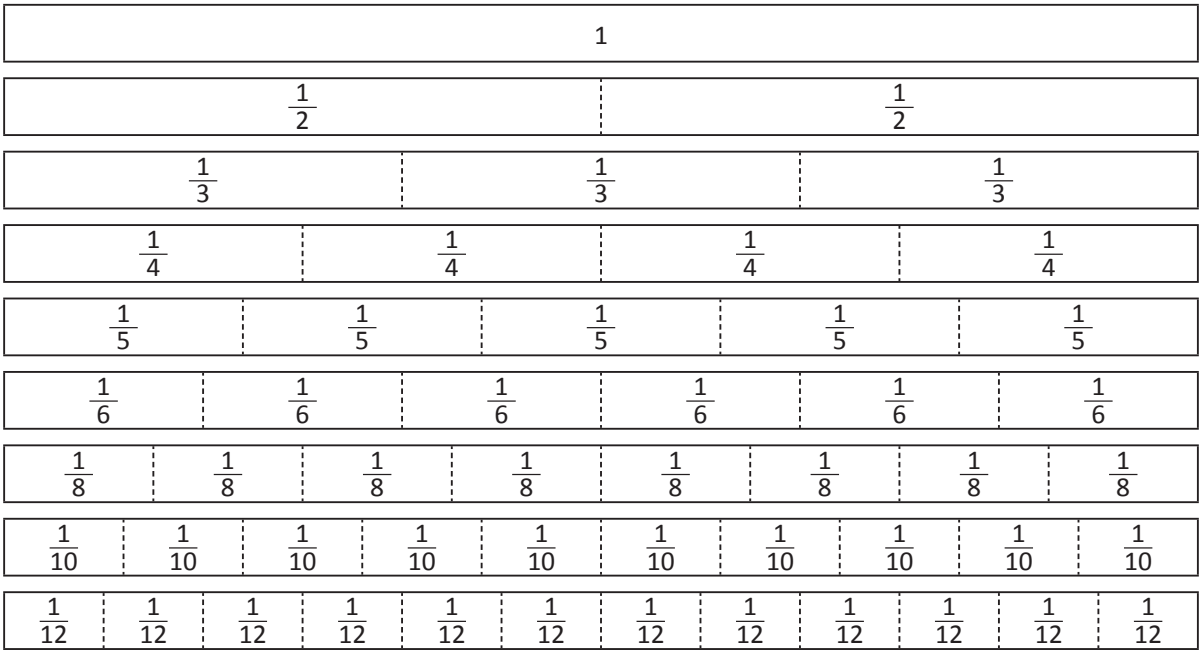
d What is $\frac{3}{4}$ of 16?
16 ÷ 4 = ☐
3 × _____ = ☐
$\frac{3}{4}$ × 16 = ☐

e What is $\frac{2}{8}$ of 24?
24 ÷ 8 = ☐
2 × _____ = ☐
$\frac{2}{8}$ × 24 = ☐

f What is $\frac{2}{7}$ of 14?
14 ÷ 7 = ☐
2 × _____ = ☐
$\frac{2}{7}$ × 14 = ☐

Fractions – comparing and ordering fractions

We can use number lines or fraction strips to help us compare and order fractions.



1 **Use the strips above to help you answer the following questions. Circle the correct answers:**

a Which is bigger? $\frac{3}{4}$ or $\frac{4}{8}$ **b** Which is smaller? $\frac{2}{10}$ or $\frac{2}{8}$ **c** Which is smaller? $\frac{2}{4}$ or $\frac{3}{12}$

2 **Use the fraction strips to:**

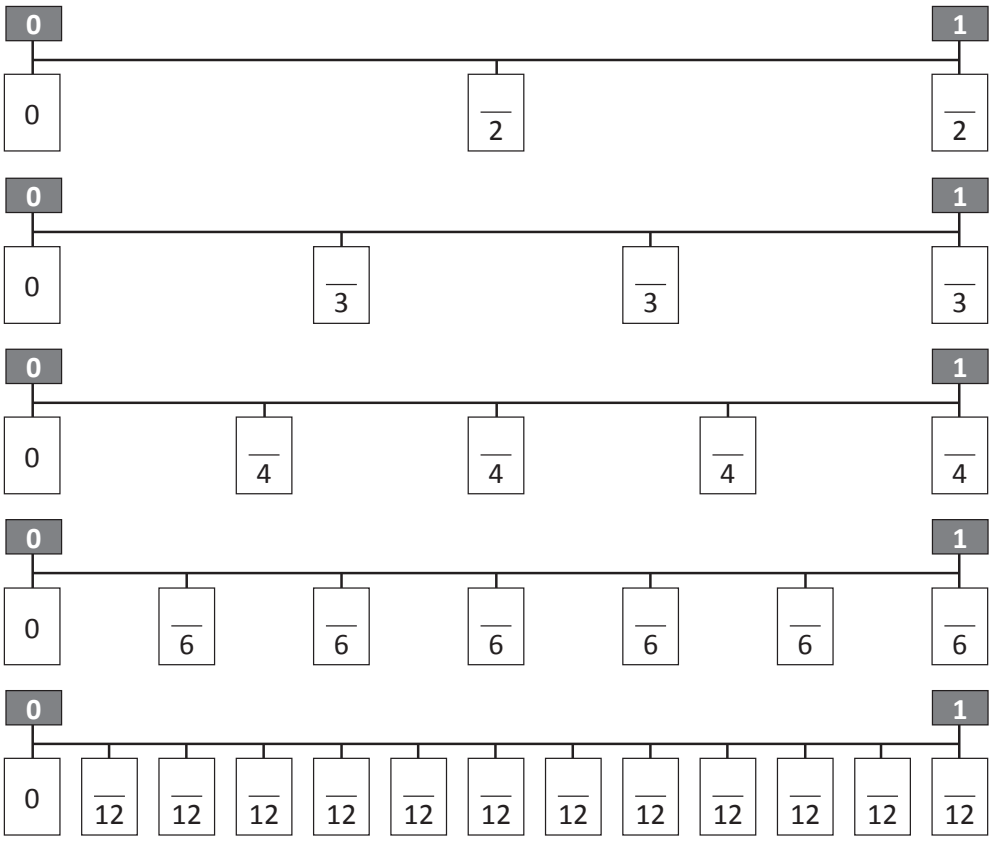
a Find 3 fractions that are the same as $\frac{1}{2}$

b Find 2 fractions that are the same as $\frac{1}{3}$

c Find the fraction that is greater than $\frac{2}{3}$ but less than $\frac{3}{4}$

3 **Write 2 similar problems for a friend to solve:**

4 **Label the missing fractions on the number line:**



5 **Are these statements true or false? Use the number lines above to help you with your decision. Remember the large end < eats the large number.**

a $\frac{1}{3} < \frac{1}{2}$ ____ **b** $\frac{1}{4} > \frac{2}{6}$ ____ **c** $\frac{1}{2} > \frac{1}{3}$ ____ **d** $\frac{1}{4} < \frac{5}{12}$ ____

e $\frac{3}{4} > \frac{7}{12}$ ____ **f** $\frac{2}{3} > \frac{3}{4}$ ____ **g** $\frac{7}{12} > \frac{1}{4}$ ____ **h** $\frac{3}{12} > \frac{1}{6}$ ____

6 **Use the number lines above to help you put these fractions in order from smallest to largest:**

a $\frac{8}{12}$ $\frac{1}{2}$ $\frac{2}{6}$ ____ ____ ____

b $\frac{1}{4}$ $\frac{2}{6}$ $\frac{1}{12}$ ____ ____ ____

c $\frac{3}{4}$ $\frac{1}{2}$ $\frac{5}{12}$ ____ ____ ____

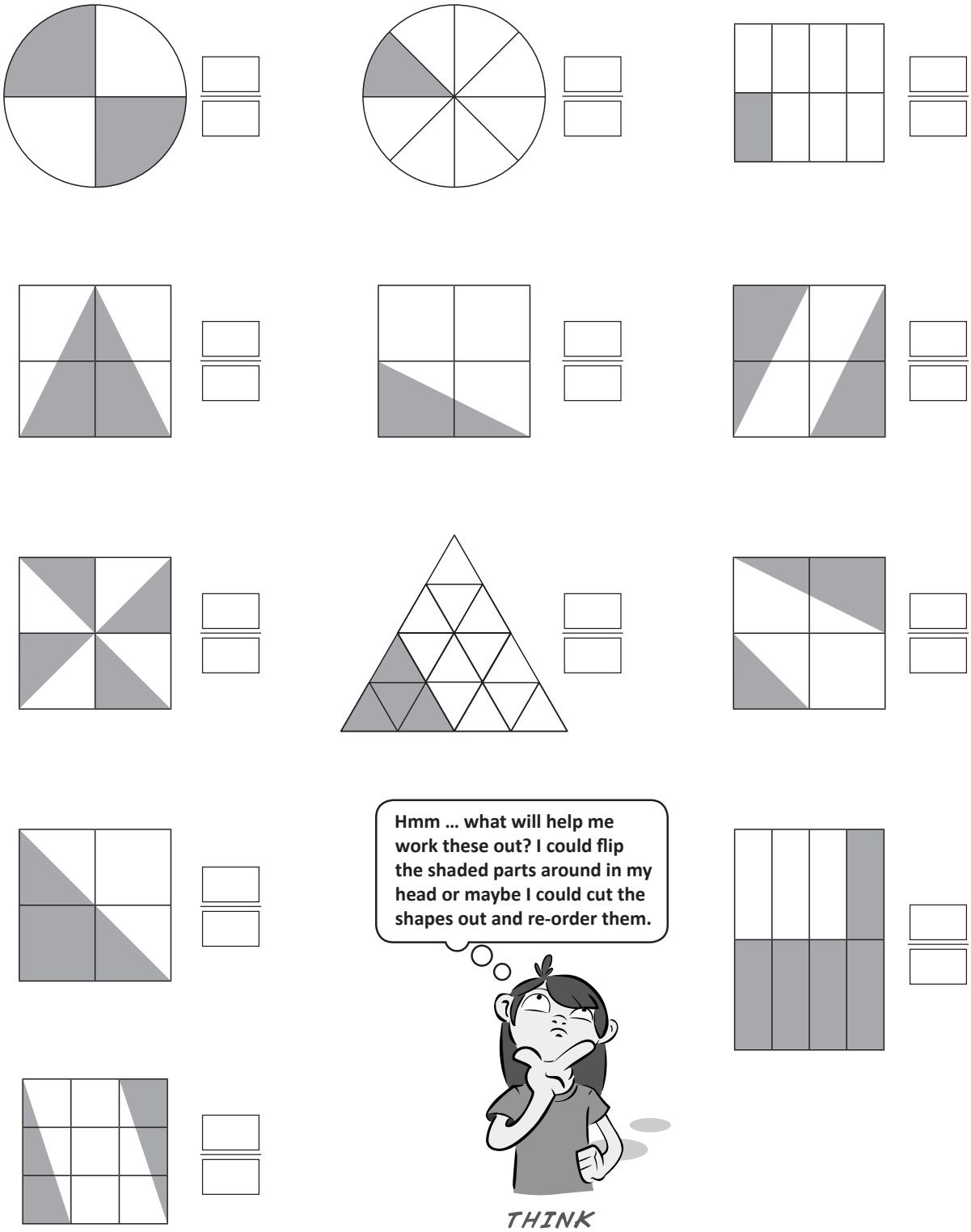
d $\frac{5}{6}$ $\frac{1}{3}$ $\frac{1}{4}$ ____ ____ ____

Find the fraction

solve

What to do

Your job is to work out what fraction of each shape is shaded. Some of them are simple to work out, others will take a little more thinking.



Hmm … what will help me work these out? I could flip the shaded parts around in my head or maybe I could cut the shapes out and re-order them.

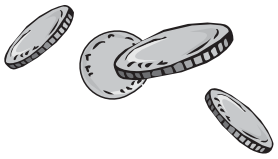
THINK

Coin collection

apply

Getting ready

In this activity you will use your knowledge of fractions to share old coins among a family.



What to do

Mum gave you and your (imaginary) brothers and sisters a box of old coins to share (also imaginary, unfortunately). She has decided to share them out based on how well you all cleaned your rooms. There are 72 coins in the box. Follow the directions to find how many you each receive:

a Your sister Sarah can have $\frac{1}{4}$ of the coins. How many coins is this?

b Your sister Claire wished she had known this condition when she cleaned up her room. She can only have $\frac{1}{12}$ of the coins. How many is this?

c Your brother Angus did a stellar job on his room and is entitled to $\frac{2}{6}$ of the coins. How many is this?

d You get the rest! How many do you get?

e What is your share expressed as a fraction?

What to do next

Write an addition sentence to show how the coins were shared.

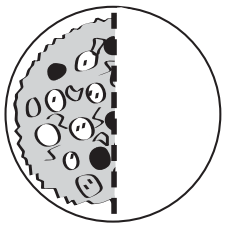
Now write a fraction addition sentence to show how they were shared.

$$\frac{\square}{72} + \frac{\square}{72} + \frac{\square}{72} + \frac{\square}{72} = \frac{\square}{72}$$

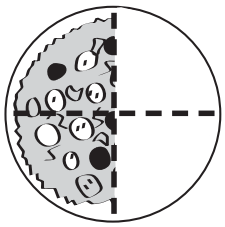
Types of fractions – equivalent fractions

Different fractions can have the same amount. They are equivalent.

This healthy vegetable pizza has been cut into 2 parts. $\frac{1}{2}$ has been eaten.

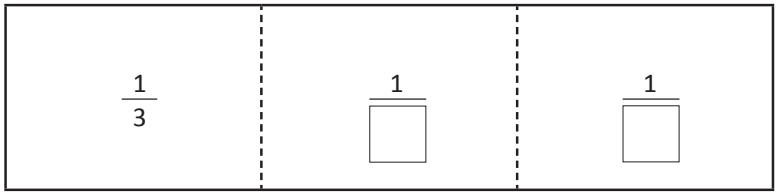


This healthy vegetable pizza has been cut into 4 parts. $\frac{2}{4}$ has been eaten.

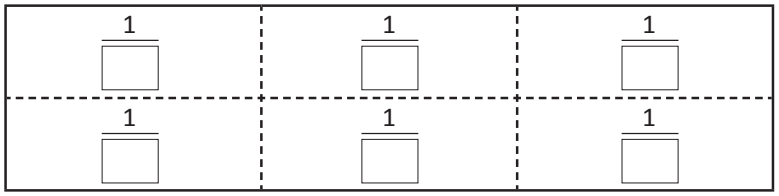


1 **Do this folding paper activity to help you understand how equivalent fractions work:**

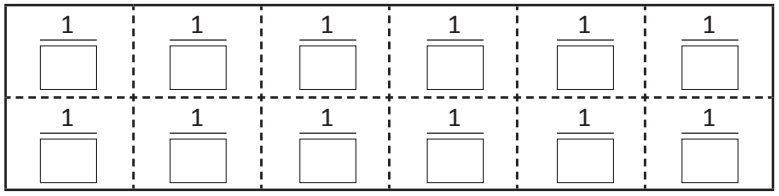
a You'll need a separate rectangular piece of paper similar to the one below. Fold it into 3 equal parts and then unfold it. Label each section with its fraction here:



b Refold your paper into thirds and fold the thirds into halves. Unfold the paper. What fraction does each of the new sections represent? Label them here:



c Fold the paper back again and fold it in half once more. Unfold it and label the fractions here:



2 **Use the diagrams in Question 1 to help you answer the following questions:**

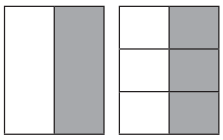
a What fractions can you find that are equivalent to $\frac{1}{3}$? $\frac{\square}{\square}$ $\frac{\square}{\square}$

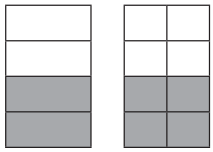
b What fractions can you find that are equivalent to $\frac{8}{12}$? $\frac{\square}{\square}$ $\frac{\square}{\square}$

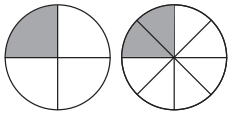
c What other fractions can you think of that might be equivalent to $\frac{6}{12}$?

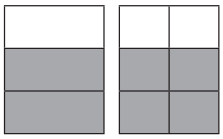
Types of fractions – equivalent fractions

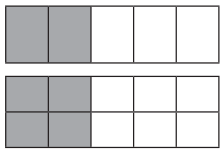
3 **Write the equivalent fraction for each of these:**

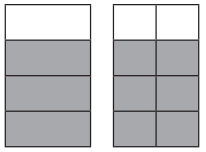
a  $\frac{1}{2} = \frac{\square}{6}$

b  $\frac{2}{4} = \frac{\square}{8}$

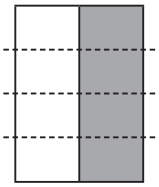
c  $\frac{1}{4} = \frac{\square}{8}$

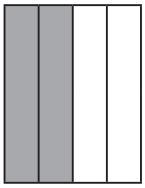
d  $\frac{2}{3} = \frac{\square}{6}$

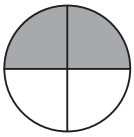
e  $\frac{2}{5} = \frac{\square}{10}$

f  $\frac{3}{4} = \frac{\square}{8}$

4 **Find an equivalent fraction for each of these. Divide the diagrams to create a different number of equal parts. The first one has been done for you.**

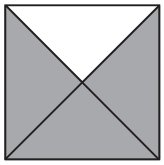
a  $\frac{1}{2} = \frac{4}{8}$

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

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

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

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

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

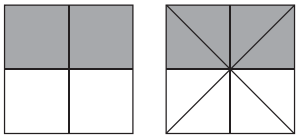
5 **Is $\frac{2}{8}$ equivalent to $\frac{1}{4}$? Use diagrams to help explain your reasoning:**

6 **Is $\frac{2}{3}$ equivalent to $\frac{5}{6}$? Use diagrams to help explain your reasoning:**

Types of fractions – equivalent fractions

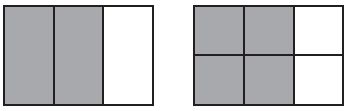
7 **This section has been completed by our work experience boy. How did he go? Give him some feedback:**

a



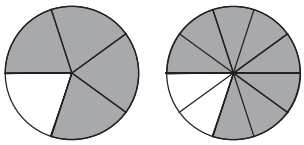
$\frac{2}{4} = \frac{4}{8}$

b



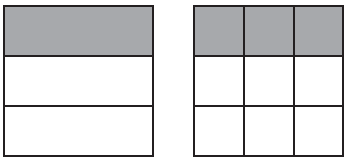
$\frac{2}{3} = \frac{4}{3}$

c



$\frac{4}{5} = \frac{8}{5}$

d

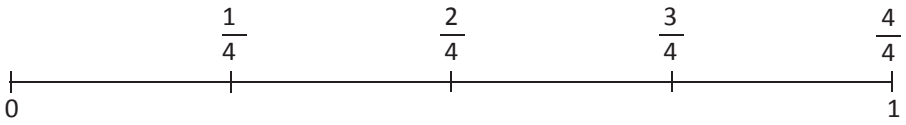


$\frac{1}{3} = \frac{3}{6}$

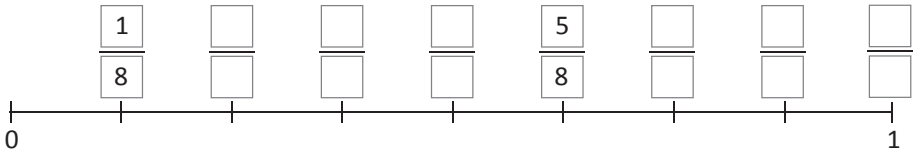
Your feedback:

8 **Complete the number lines. The first has been done for you:**

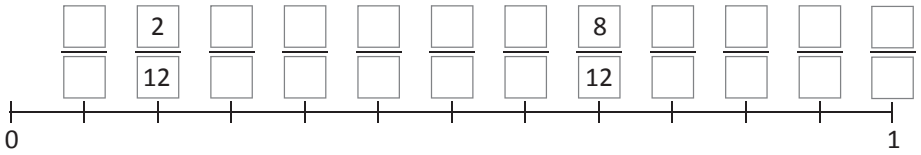
a



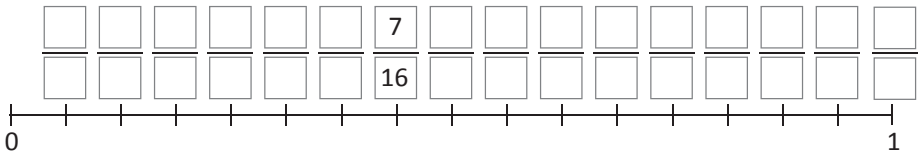
b



c



d



9 **Use the number lines to answer the following:**

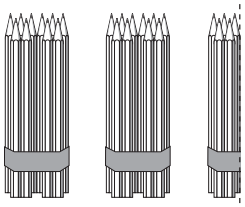
a How many equivalent fractions can you find for $\frac{1}{4}$?

b Did you find a pattern? Can you continue it?

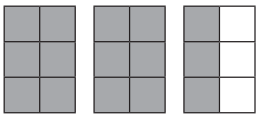
Types of fractions – mixed numerals and improper fractions

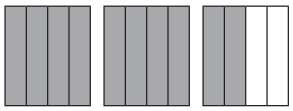
Mixed numerals consist of both a whole number and a fraction.
Ky has 2 full packets of pencils and one half packet of pencils.

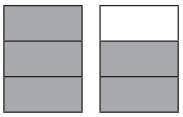
This is shown as $2\frac{1}{2}$

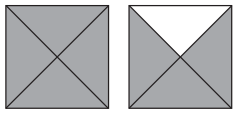


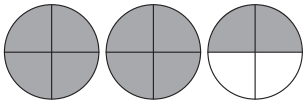
1 **Write a mixed numeral for each of the shaded sets of shapes:**

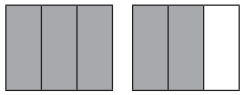
a  = ☐ ☐/☐

b  = ☐ ☐/☐

c  = ☐ ☐/☐

d  = ☐ ☐/☐

e  = ☐ ☐/☐

f  = ☐ ☐/☐

2 **Draw some diagrams or pictures that would represent:**

a

3 and $\frac{1}{2}$

b

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

c

1 and $\frac{1}{4}$

d

3 and $\frac{3}{4}$

3 **What might the missing numbers be?**

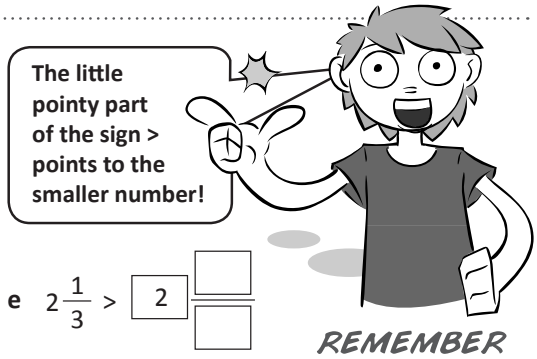
a $1\frac{1}{2} > 1\ \frac{\square}{4}$

b $3\frac{1}{3} < \frac{\square}{\square}$

c $1\frac{1}{5} < 1\ \frac{\square}{\square}$

d $2\frac{3}{6} > 2\ \frac{\square}{\square}$

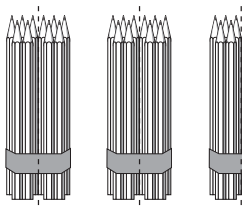
e $2\frac{1}{3} > 2\ \frac{\square}{\square}$



Types of fractions – mixed numerals and improper fractions

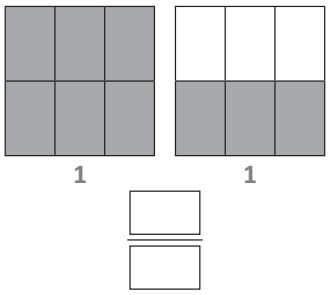
Mixed numerals can also be written as improper fractions.
Look again at Ky's full packets and one half packet of pencils.
This is five halves.

Written as an improper fraction, this is $\frac{5}{2}$.

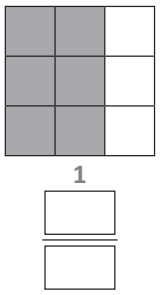


4 **Express these as fractions. Circle any improper fractions:**

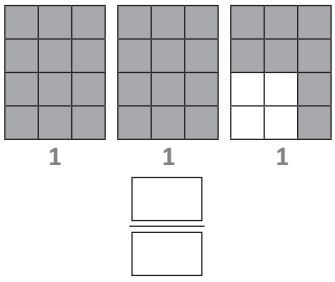
a



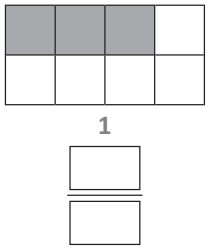
b

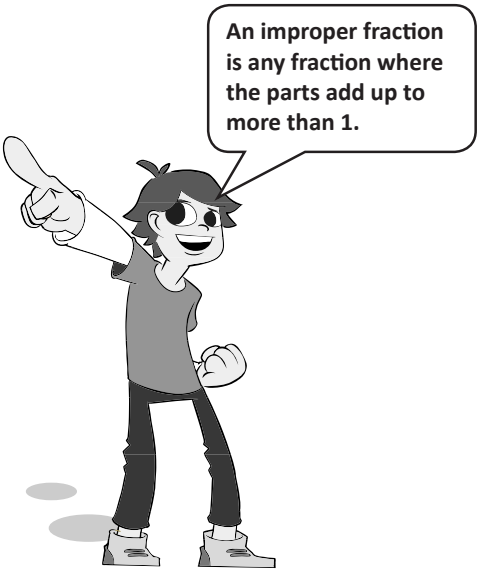


c



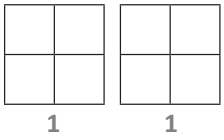
d



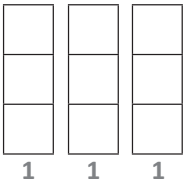


5 **Colour the shapes to create the following improper fractions. Remember each shape is one whole.**

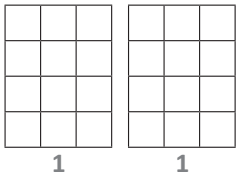
a $\frac{5}{4}$



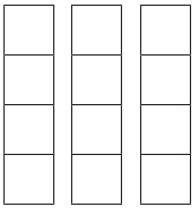
b $\frac{7}{3}$



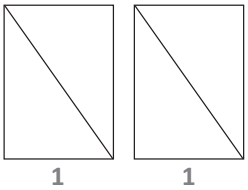
c $\frac{17}{12}$



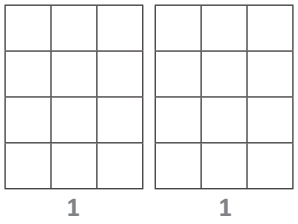
d $\frac{11}{4}$



e $\frac{3}{2}$

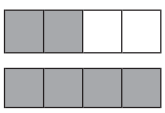


f $\frac{20}{12}$



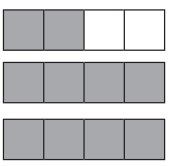
6 **Which is bigger? Circle the larger fraction:**

a $\frac{5}{4}$ or



b $\frac{3}{2}$ or

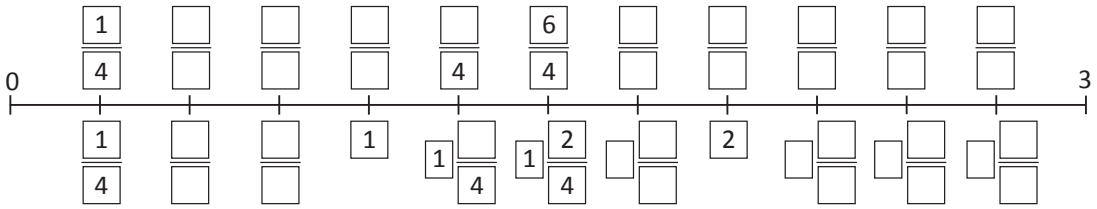
c $\frac{9}{4}$ or



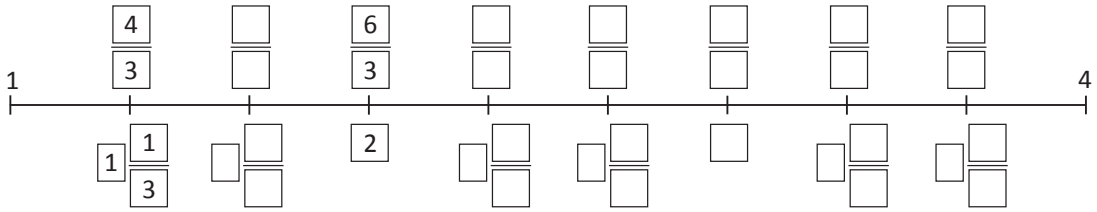
Types of fractions – mixed numerals and improper fractions

7 **Complete the number lines by filling in the boxes:**

a



b



8 **Use your completed number lines to help you answer these questions:**

a What is $2\frac{1}{4}$ expressed as an improper fraction? $\frac{\square}{\square}$

b Write $\frac{13}{11}$ as a mixed number. $\square\frac{\square}{\square}$

c Find an improper fraction that is greater than $1\frac{1}{3}$ but less than $\frac{10}{3}$. $\frac{\square}{\square}$

d Your teacher offers you the choice between $\frac{10}{4}$ or $2\frac{1}{4}$ hours of rubbish duty. Which should you choose?

9 **Show the improper fractions. The number line at the top of the page will help:**

a $1\frac{1}{3} = \frac{\square}{3}$

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

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

d $\frac{\square}{3} = 2\frac{1}{3}$

e $\frac{7}{\square} = 1\frac{3}{4}$

f $\frac{\square}{\square} = 1\frac{2}{3}$

g $\frac{6}{4} = \square\frac{\square}{\square}$

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

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

Equivalent fraction snap

apply

Getting ready

Play this game with a friend. You'll need two sets of these cards. Make 2 copies of this page, cut out the cards and combine the two sets into one pile.

What to do

Player 1 deals the cards face down between the two players. Player 2 starts the game by placing a card in the centre. Players take turns in turning over the top card on their pile and placing it in the centre pile. Call, "Snap!" and take the centre pile if the card is identical to or an equivalent fraction to the card already face up.

The four wild cards can be used to make a Snap! When playing a wild card, you must name a correct equivalent fraction. The person with all the cards at the end is the winner.

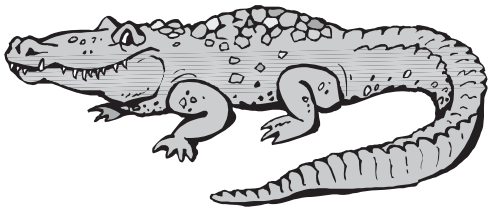
$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{4}{8}$
$\frac{?}{?}$ WILD CARD	$\frac{4}{6}$	$\frac{2}{4}$	$\frac{3}{12}$
$\frac{4}{16}$	$\frac{9}{12}$	$\frac{?}{?}$ WILD CARD	$\frac{3}{4}$
$\frac{2}{8}$	$\frac{8}{12}$	$\frac{10}{20}$	$\frac{50}{100}$
$\frac{12}{16}$	$\frac{25}{100}$	$\frac{11}{44}$	$\frac{75}{100}$

Feeding time

apply

Getting ready

Emma is confused. She understands mixed numerals but not improper fractions. Her dad has asked her to help out at their wildlife zoo but he has used improper fractions in his directions.



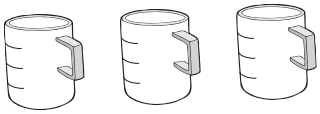
What to do

Shade the correct amounts on the containers, then convert the improper fractions to mixed numerals for Emma so the animals can be fed correctly.

Dear Em,

Off to see a man about an iguana. Be a love and feed the animals for me, will you? Back for the afternoon feed.

At 6 am, feed the lambs $\frac{6}{4}$ cups of pellets.

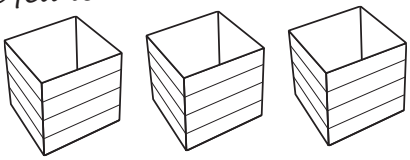


_____ cups

At 9 am, give Cuddli the croc her $\frac{5}{2}$ buckets of steak. (Remember Cuddli considers your hand to be one of her favourite food groups).

_____ buckets

At 11 am, feed the snakes their $\frac{7}{4}$ boxes of rats. Stop grimacing. Snakes deserve to be fed too.



_____ boxes

At midday, feed the wombats their $\frac{5}{3}$ buckets of mushrooms and grass. They won't be out for it till the evening but they want it now. Who would have thought wombats would be so precious? Go figure …

_____ buckets

Dad xxx

Fractions, decimals and percentages – tenths

Decimal fractions also express parts of a whole. This strip has been divided into 10 equal parts. Three out of ten or $\frac{3}{10}$ is shaded.

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

We can also express this as 0.3. There are no wholes and 3 tenths.

1 **Write the shaded common fraction and its equivalent decimal fraction:**

a

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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

b

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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

c

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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

2 **Shade the fraction strips to match the common fraction or decimal fraction:**

a 0.8

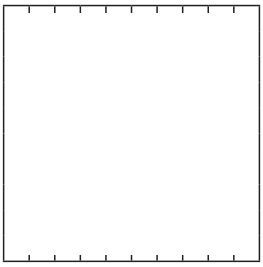
b $\frac{5}{10}$

c 0.4

d 0.9

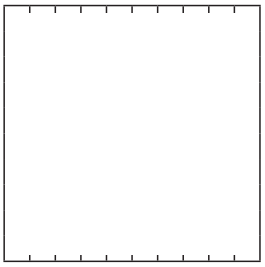
3 **Use a ruler and a pencil to divide the wholes into tenths. Shade the given amounts and express as decimals:**

a



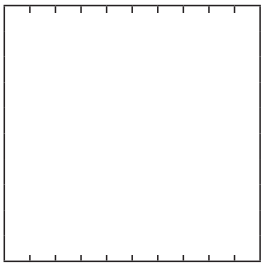
$\frac{4}{10}$ $\square$

b



$\frac{8}{10}$ $\square$

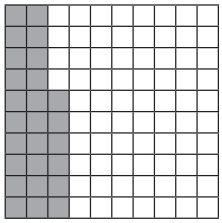
c



$\frac{5}{10}$ $\square$

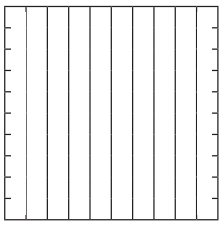
Fractions, decimals and percentages – tenths and hundredths

A hundredth is a tenth of a tenth.
Here, 26 hundredths have been shaded.
We write this as **0.26**
There are no ones, 2 tenths and 6 hundredths.



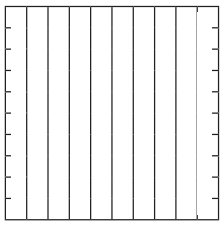
1 **Use a ruler and a pencil to divide these into hundredths and then shade the specified amounts:**

a



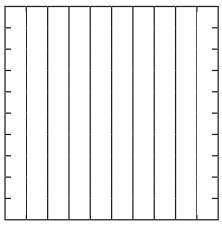
$\frac{61}{100}$ 0 •

b



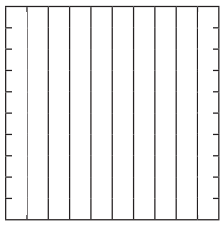
$\frac{82}{100}$ 0 •

c



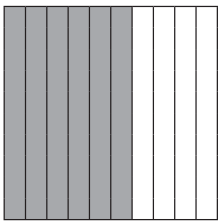
$\frac{55}{100}$ 0 •

d

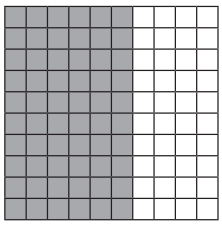


$\frac{27}{100}$ 0 •

Six tenths are shaded here.



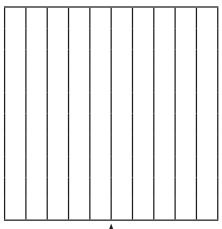
Sixty hundredths are shaded here.



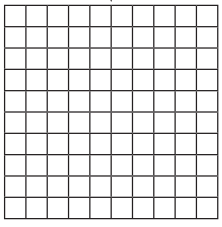
What do you notice? Sixty hundredths and six tenths have the same value 0.60 = 0.6

2 **Check that the above statement is true by shading the amounts. Are they the same?**

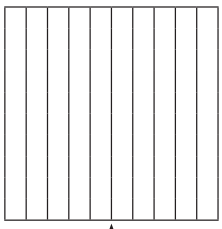
a



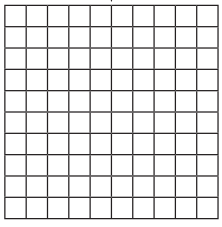
4 tenths
40 hundredths



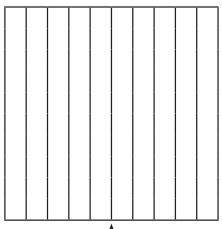
b



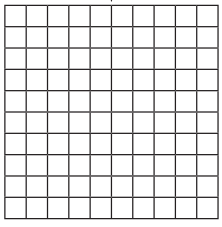
6 tenths
60 hundredths



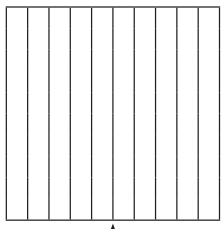
c



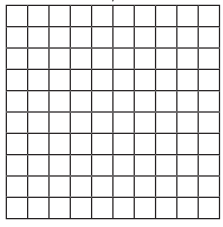
8 tenths
80 hundredths



d



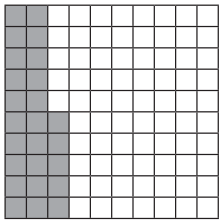
2 tenths
20 hundredths



Fractions, decimals and percentages – tenths and hundredths

3 **Complete these statements. The first one has been done for you.**

a

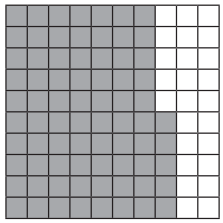


This is $\frac{25}{100}$

It can be renamed as:

$\frac{2}{10}$ and $\frac{5}{100}$

b

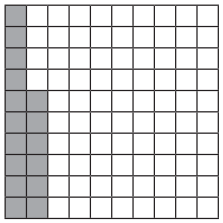


This is $\frac{75}{100}$

It can be renamed as:

_____

c

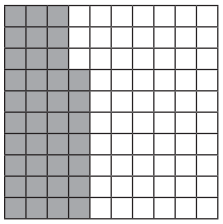


This is $\frac{16}{100}$

It can be renamed as:

_____

d

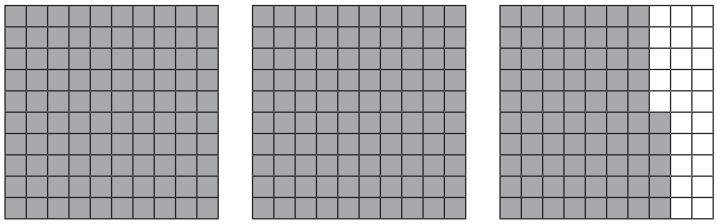


This is $\frac{37}{100}$

It can be renamed as:

_____

e



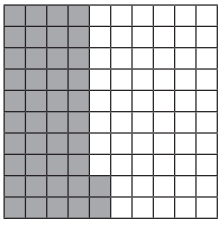
This represents 2 wholes and $\frac{75}{100}$

It can be renamed as:

_____

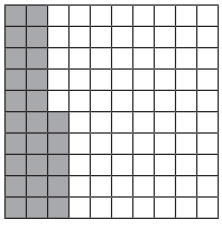
4 **Complete the missing information:**

a



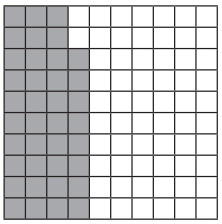
$\frac{42}{100} = \frac{4}{10} + \frac{2}{100} =$ ☐.☐☐

b



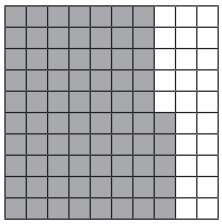
$\frac{\square}{100} = \frac{\square}{10} + \frac{\square}{100} =$ ☐.☐☐

c



$\frac{\square}{100} = \frac{\square}{10} + \frac{\square}{100} =$ ☐.☐☐

d



$\frac{\square}{100} = \frac{\square}{10} + \frac{\square}{100} =$ ☐.☐☐

Fractions, decimals and percentages – decimal place value

A hundredth is a tenth of a tenth.

Ones		Tenths	Hundredths
2	•	2	5

This number has 2 ones, 2 tenths and 5 hundredths.

1 **Write these numbers in the place value chart:**

	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths
a 5 tens, 3 ones and 8 tenths				•		
b 7 hundreds, 8 tens, 4 ones, 2 tenths and 3 hundredths				•		
c 9 tens and 8 tenths				•		
d 6 hundreds, 8 tenths and 4 hundredths			0	0 •		
e 4 ones, 9 tenths and 8 hundredths				•		
f 3 ones, 4 tenths and 2 hundredths				•		
g 2 tens, 3 ones and 4 hundredths				•	0	

2 **Answer true or false to the following questions. Score 0.5 points for each correct answer.**

a The value of 4 in 56.48 is 4 hundredths.

b The value of 3 in 38.65 is 3 tens.

c The value of 7 in 0.75 is 7 hundredths.

d Thomas thought of a decimal number between 5.61 and 5.91. The number could have been 5.64.

e 97.3 is 9 tens, 7 ones and 3 hundredths.

T or F	Score
Total	

Fractions, decimals and percentages – decimal place value

When comparing and ordering decimals, the place value of a digit is crucial. The further the digit is to the left, the greater its value.

Even though one hundredth sounds big, it is actually very small. Remember, one hundredth is just a single piece of a whole divided into a hundred parts. One tenth is actually ten times bigger than one hundredth.

3 **Which is bigger? Circle the correct answer:**

a 0.7 or 0.07

b 0.56 or 6 tenths

c 7.5 or $\frac{7}{10}$

d 15 or 0.15

e $\frac{1}{2}$ or 0.25

f 35 or 3.5

4 **Use < or > or = to show the relationship between the two numbers:**

a 6.89 _____ 6.76

b 9.08 _____ 9.8

c 11.80 _____ 11.8

5 **This chart shows the vital statistics of some Roosters Football Club players.**

Name	Height	Weight
Lanky	2.06 m	79.05 kg
Crusher	1.96 m	110.65 kg
Crumber	1.73 m	79.93 kg
Cazaly	1.84 m	88.91 kg
Stomper	1.81 m	99.55 kg
Whale	2.01 m	118.23 kg
Twinkle Toes		65.78 kg

a Who is tallest? Who is shortest?

_____

b Put these players in order of lightest to heaviest: Crumber, Stomper, Cazaly:

_____

c Who are the two tallest players?

_____

d Who would you least like to have tackle you? Why?

_____

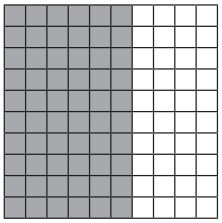
e Twinkle Toes left the club before his height was measured. We know he is taller than Crumber and shorter than Cazaly. What could his height be? Add it to the table.

Fractions, decimals and percentages – percentages

Percent means part per hundred and is expressed using the symbol %.

Here, 60% has been shaded grey.

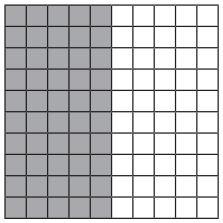
It is the same as 60 hundredths. $\frac{60}{100} = 0.60 = 60\%$



1 **Think of at least five times you see the % sign or use percentages:**

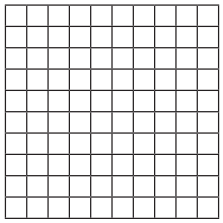
2 **Fill in the missing values and shade the grids:**

a



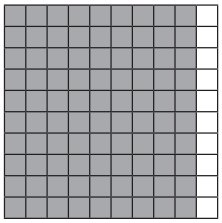
$\frac{50}{100}$	0.	%

b



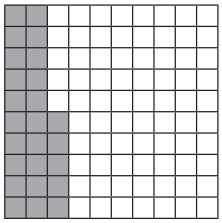
$\frac{30}{100}$	0.3	%

c



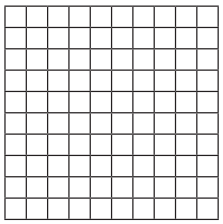
___	0.	90%

d



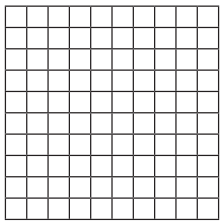
___	0.25	%

e



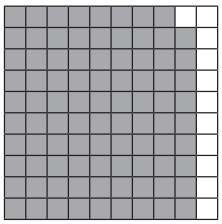
$\frac{45}{100}$	0.	%

f



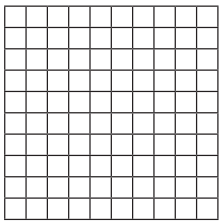
___	0.75	%

g



___	0.	89%

h



___	0.42	%

3 **Are these statements correct?**

a 75% is greater than 0.5 ☐

b One quarter is the same as 50% ☐

c 45% is greater than 0.5 ☐

d 0.42 is equivalent to 425 ☐

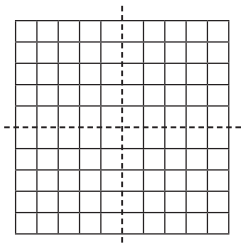
e You score 100% on a test. Your friend scores 20/20. You both received the same score. ☐

Fractions, decimals and percentages – percentages

It is useful to know some common percentages such as 25%, 50% or 75%.

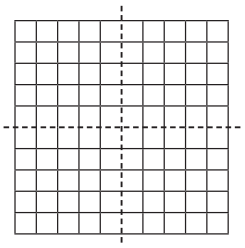
4 **Shade the grids and show the following fractions by completing the missing information:**

a



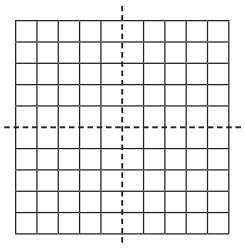
$\frac{1}{4}$	0.25	25%

b



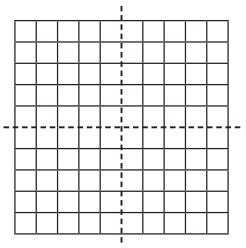
$\frac{1}{2}$	0.	%

c



$\frac{3}{4}$	0.	%

d



$\frac{4}{4}$	.	%

5 **Shade these shapes to show the following percentages:**

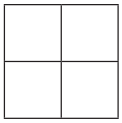
a

50%

b

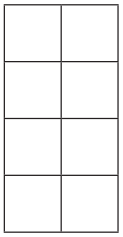
25%

c



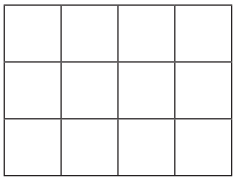
75%

d



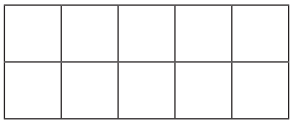
50%

e



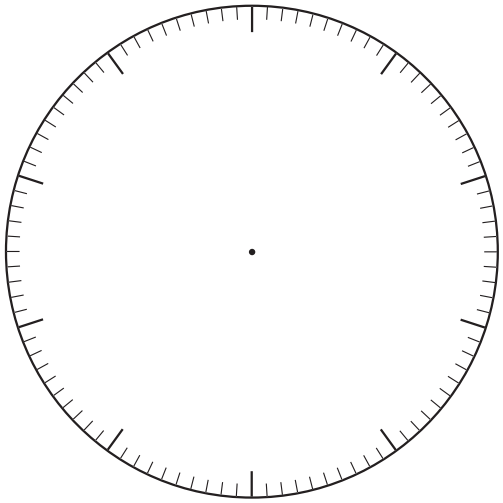
25%

f



100%

6 **James goes on holiday. He has $100 spending money and spends it as outlined below. Show this on the pie graph and label each section of the pie with the correct percentage:**



Match 'n' snap

apply

Getting ready

This is a game for 2 or more players. You will race against each other to come up with equivalent fractions, decimals or percentages to match those on cards. You'll need one copy of this page and one copy of page 25 between you.

What to do

Cut out the playing cards, mix them up and put them face down in a pile.

Cut out the blank cards on page 25 and divide them between the two of you. Make sure you both have a pencil each.

Turn over the first playing card. Both players write an equivalent fraction, decimal or percentage to match it on one of the blank cards and cover the playing card as quickly as possible.

For example, the playing card may say 50% – you could write $\frac{1}{2}$ or $\frac{5}{10}$ or $\frac{50}{100}$.

The first person to cover the card with a correct match wins and takes the pair. The player at the end of the game with the most cards is the winner.

Playing Cards

$\frac{75}{100}$	25%	$\frac{3}{4}$	$\frac{1}{4}$
0.5	0.25	$\frac{1}{2}$	50%
0.1	$\frac{1}{10}$	10%	0.75

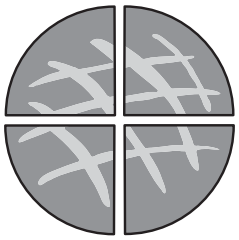
Blank Cards

Calculating – adding and subtracting fractions with like denominators

I used $\frac{2}{4}$ of a loaf of bread for breakfast.

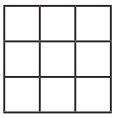
Then I used another $\frac{1}{4}$ for lunch.

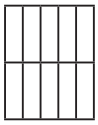
How many quarters did I use altogether? $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

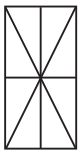


1 **Shade the shapes to help you answer the problems:**

a  $\frac{1}{3} + \frac{1}{3} = \frac{\square}{\square}$

b  $\frac{3}{9} + \frac{3}{9} = \frac{\square}{\square}$

c  $\frac{4}{10} + \frac{3}{10} = \frac{\square}{\square}$

d  $\frac{3}{8} + \frac{2}{8} = \frac{\square}{\square}$

2 **Try these. Draw some diagrams if that will help you.**

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

b $\frac{2}{7} + \frac{3}{7} = \frac{\square}{\square}$

c $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{\square}{\square}$

d $\frac{1}{10} + \frac{5}{10} + \frac{1}{10} = \frac{\square}{\square}$

3 **Write addition fraction sentences for the following problems. Write your answers:**

a $\frac{1}{3}$ of the kids in Bailey's class played basketball at recess. $\frac{1}{3}$ of the kids played football. $\frac{1}{3}$ of the kids sat round and chatted. What fraction of the class played sport?

$\frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$

b Josh spent $\frac{1}{5}$ of his pocket money at the milk bar and $\frac{2}{5}$ buying credits for his game. Write a fraction sentence to show the fraction he spent.

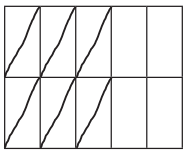
$\frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$

4 **Look at the problem $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$. Why does the 4 stay as 4 – why isn't it $\frac{2}{4} + \frac{1}{4} = \frac{3}{8}$?**

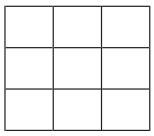
Calculating – adding and subtracting fractions with like denominators

I had $\frac{3}{4}$ of a sandwich in the fridge. I ate $\frac{1}{4}$. I had $\frac{2}{4}$ left. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$

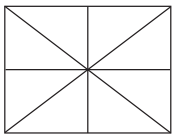
5 **Find answers to these subtraction problems. The first one has been done for you.**

a 

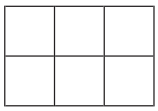
$\frac{10}{10} - \frac{6}{10} = \frac{4}{10}$

b 

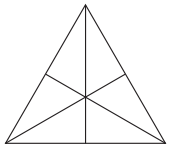
$\frac{9}{9} - \frac{8}{9} = \frac{\quad}{\quad}$

c 

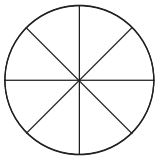
$\frac{8}{8} - \frac{4}{8} = \frac{\quad}{\quad}$

d 

$\frac{6}{6} - \frac{2}{6} = \frac{\quad}{\quad}$

e 

$\frac{6}{6} - \frac{2}{6} = \frac{\quad}{\quad}$

f 

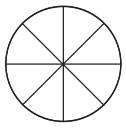
$\frac{8}{8} - \frac{6}{8} = \frac{\quad}{\quad}$

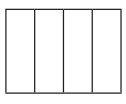
6 **Use the diagrams to help you solve these problems:**

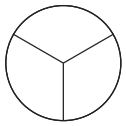
a Marita cut a loaf of bread into 8 equal slices and served 2 of them at breakfast. What fraction was left?

b Sam played a soccer game. He played goalie for 1 quarter of the game and in attack for the rest. What fraction of the game did he spend in attack?

c Jacinta spent $\frac{1}{3}$ of her pocket money on lunch and $\frac{1}{3}$ of it on a magazine. What fraction did she have left?







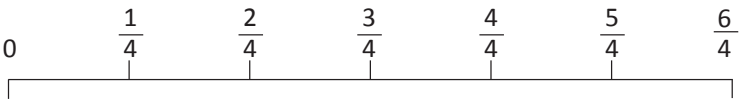
7 **Use the number lines to help you work out the answers to these problems:**

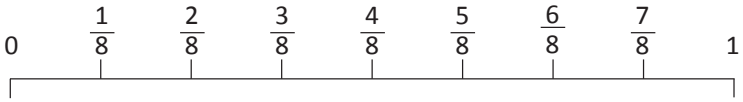
a $\frac{1}{4} + \frac{2}{4} = \frac{\quad}{4}$

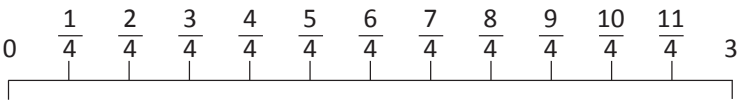
b $\frac{7}{8} - \frac{3}{8} = \frac{\quad}{\quad}$

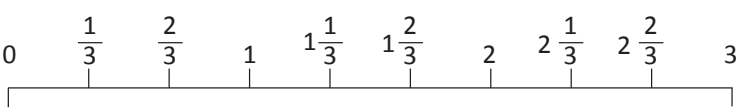
c $\frac{6}{4} - \frac{3}{4} = \frac{\quad}{\quad}$

d $2\frac{2}{3} - \frac{1}{3} = \square\ \frac{\quad}{\quad}$









Calculating – adding and subtracting fractions to and from a whole

Adding fractions to whole numbers is a simple process.

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

1 **Add these fractions and whole numbers:**

a $2 + \frac{1}{2} = \square\frac{\square}{\square}$ **b** $4 + \frac{1}{3} = \square\frac{\square}{\square}$ **c** $3 + \frac{3}{4} = \square\frac{\square}{\square}$

d $\frac{1}{2} + 5 = \square\frac{\square}{\square}$ **e** $\frac{2}{3} + 4 = \square\frac{\square}{\square}$ **f** $\frac{4}{7} + 9 = \square\frac{\square}{\square}$

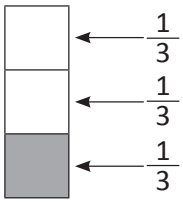
g $\frac{1}{2} + \square = 6\frac{1}{2}$ **h** $\square + \frac{2}{3} = 2\frac{2}{3}$ **i** $\frac{1}{5} + \square\frac{\square}{\square} = 2\frac{3}{5}$

How do we subtract fractions from a whole? We rename the wholes to make it simpler.

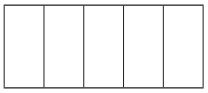
Look at the problem $1 - \frac{1}{3}$.

How many $\frac{1}{3}$ are in 1 whole? There are $\frac{3}{3}$ in a whole.

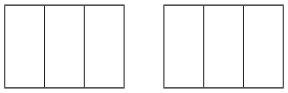
Now the problem is easier: $\frac{3}{3} - \frac{1}{3} = \frac{2}{3}$



2 **Rename the wholes as fractions and use the diagrams to help you solve these problems:**

a $1 - \frac{2}{5} =$ 

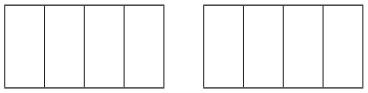
$=$

b $2 - \frac{1}{3} =$ 

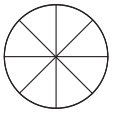
$=$

c $1 - \frac{1}{4} =$ 

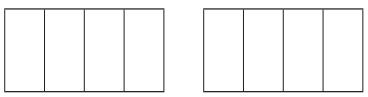
$=$

d $2 - \frac{3}{4} =$ 

$=$

e $1 - \frac{3}{8} =$ 

$=$

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

$=$

Calculating – adding and subtracting fractions

1 **What could the missing numbers be? Create two different options for each:**

a $\frac{\square}{4} + \frac{\square}{4} = \frac{\square}{4}$

$\frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$

b $\frac{\square}{8} - \frac{\square}{8} = \frac{\square}{8}$

$\frac{\square}{\square} - \frac{\square}{\square} = \frac{\square}{\square}$

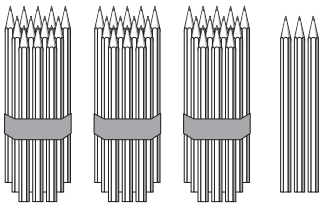
c $\square\frac{\square}{\square} + \frac{\square}{\square} = \square\frac{\square}{\square}$

$\square\frac{\square}{\square} + \frac{\square}{\square} = \square\frac{\square}{\square}$

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

$\square\frac{\square}{\square} + \square\frac{\square}{\square} = \square\frac{\square}{\square}$

2 **Solve these problems. Draw diagrams if they help:**



a You have $3\frac{1}{4}$ bundles of pencils. One friend takes $\frac{1}{4}$ and another takes $\frac{2}{4}$ and another takes $\frac{1}{4}$. What fraction do you have left?

b What fractions do you know that have a difference of $\frac{1}{4}$?

Calculating – adding decimal fractions

How do we add decimal fractions using a written strategy?

We arrange the numbers so the place values line up and then we start with the smallest value.

We first add the tenths. 6 tenths and 7 tenths is 13 tenths.

We rename this as 1 whole and 3 tenths.

We write the 3 in the tenths column and move the 1 to the wholes column.

Then we add the ones. 1 + 1 + 4 = 6

$$\begin{array}{r} {}^{1}1.6 \\ +\ 4.7 \\ \hline 6.3 \end{array}$$

1 **Knowing how to rename is a useful skill when adding decimal fractions. Practise your renaming skills here by colour coding the matching boxes:**

10 tenths

18 tenths

68 hundredths

1 tenth and 4 hundredths

4 ones, 1 tenth and 4 hundredths

23 tenths

414 hundredths

7 ones and 6 tenths

1 one

6 tenths and 8 hundredths

2 ones and 3 tenths

76 tenths

14 hundredths

1 one and 8 tenths

2 **Add these decimal fractions:**

a
$$\begin{array}{r} 2.6 \\ +\ 3.3 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 4.7 \\ +\ 5.4 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 5.4 \\ +\ 3.5 \\ \hline \\ \hline \end{array}$$

d
$$\begin{array}{r} 1.5 \\ +\ 12.3 \\ \hline \\ \hline \end{array}$$

e
$$\begin{array}{r} 18.6 \\ +\ 11.2 \\ \hline \\ \hline \end{array}$$

f
$$\begin{array}{r} 9.4 \\ +\ 3.7 \\ \hline \\ \hline \end{array}$$

3 **Now try these. Start with the hundredths and remember to rename if neccessary:**

a
$$\begin{array}{r} 3.46 \\ +\ 5.23 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 4.72 \\ +\ 3.19 \\ \hline \\ \hline \end{array}$$

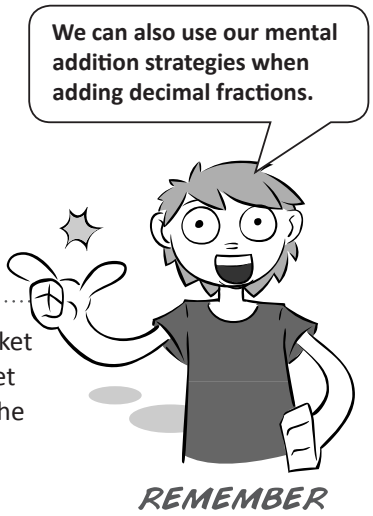
c
$$\begin{array}{r} 7.36 \\ +\ 5.65 \\ \hline \\ \hline \end{array}$$

Calculating – adding decimal fractions

4 **Use a mental or written strategy of your choice to solve these problems:**

a Add 6.06 and 5.42

b Add 12.24 and 67.12



c Jack scored 7.25 for his first dive and 8.35 for his second. What was his total score?

d Kate bought an adult movie ticket costing $9.50 and a child's ticket costing $4.95. How much did she spend in total?

5 **This is a sample of the menu at Laura's Lunches.**

a Brad orders a souvlaki, soup and an orange juice. How much will this cost him?

b Angelina orders a sushi roll, a bottle of water and a piece of fruit. What will this cost her?

c Choose your own lunch. Itemise your list and calculate the total value of your order.

Laura's Lunches

Salad sandwich	4.25
Sushi rolls	2.20
Soup	1.95
Souvlaki	7.35
Fruit	.60
Stirfry noodles	4.95
Salad	1.55
Orange juice	1.95
Bottle of water	2.15
Fruit salad	1.85

Calculating – subtracting decimal fractions

How do we subtract decimal fractions using a written strategy?

We arrange the numbers so the place values line up and then we start with the smallest value.

We first subtract the tenths. We have 2 tenths, can we subtract 5 tenths from this?

No, so we rename a one as 10 tenths. Now we have 12 tenths. 12 tenths subtract 5 tenths is 7 tenths.

We have 5 ones, can we subtract 4 ones? Yes, the answer is 1 whole.

$$\begin{array}{r} {}^{5}\cancel{6}\,.\,{}^{1}2 \\ -\ 4\,.\,5 \\ \hline 1\,.\,7 \\ \hline \end{array}$$

1 **Solve these subtraction problems:**

a
$$\begin{array}{r} 8\,.\,3 \\ -\ 2\,.\,2 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 4\,.\,7 \\ -\ 3\,.\,4 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 5\,.\,4 \\ -\ 3\,.\,5 \\ \hline \\ \hline \end{array}$$

d
$$\begin{array}{r} 1\,2\,.\,3 \\ -\ \ 5\,.\,2 \\ \hline \\ \hline \end{array}$$

e
$$\begin{array}{r} 1\,8\,.\,6 \\ -\ 1\,1\,.\,2 \\ \hline \\ \hline \end{array}$$

f
$$\begin{array}{r} 9\,.\,4 \\ -\ 3\,.\,7 \\ \hline \\ \hline \end{array}$$

2 **Now try these. Start with the hundredths and remember to rename if neccessary:**

a
$$\begin{array}{r} 8\,.\,4\,4 \\ -\ 3\,.\,2\,4 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 4\,.\,7\,2 \\ -\ 2\,.\,2\,9 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 8\,.\,4\,6 \\ -\ 1\,.\,6\,3 \\ \hline \\ \hline \end{array}$$

Sometimes we have to work with numbers that have a different amount of digits such as **8.4 – 5.35**
When this happens, we rename. 4 tenths becomes 40 hundredths: **8.40 – 5.35**

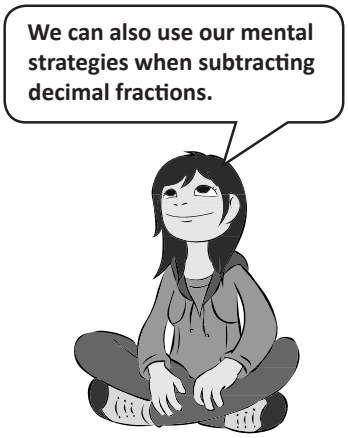
3 **Rename these problems and solve:**

a
$$\begin{array}{r} 9\,.\,5 \\ -\ 2\,.\,2\,4 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 6\,.\,1\,7 \\ -\ 2\,.\,3 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 9\,.\,3 \\ -\ 4\,.\,7\,2 \\ \hline \\ \hline \end{array}$$

Calculating – subtracting decimal fractions



4 **Use a mental or written strategy of your choice to solve these problems:**

a 27.47 – 16.27

b 13.75 – 9.25

c In 1936 Jesse Owens broke the long jump record with a leap of 2.06 m. His record stood for 25 years until fellow American, Ralph Boston leapt 2.21 m. What did he beat Jesse's record by?

d The 100 m sprint record was broken in 2009 with a time of 9.69 sec. Another athlete neared that record a month later, with a time of 9.7 sec. What is the difference between their times?

5 **Belle's basketball team measured their heights and entered them on the chart. What is the difference in heights between:**

Belle's Team

Suzy	1.43 m
Ti	1.37 m
Grace	1.47 m
Marietta	1.42 m
Madison	1.54 m
Lucy	1.58 m
Belle	1.61 m
Natasha	1.53 m
Donna	1.34 m
Nina	1.53 m

a Suzy and Lucy?

b Ti and Natasha?

c Nina and Belle?

d The tallest and shortest girl?

You cut, I choose

solve

Getting ready

You and your friend have been asked to attend a tea party. Your host, Mr Hatter, has made a sugar free chocolate clock cake for the festivities, but clearly he got a little mixed up with his numbers. It must have been all those pre-party nerves.

What to do

Anyway, he has asked you to cut the cake into 3 pieces so that each of you gets a piece with the numbers adding to the same total. How do you do it? Show your cuts on the clock cake below.

Each piece totals _____

Work out what fraction of the cake each of you receive. I should warn you, Mr Hatter wants the biggest piece.

I receive $\frac{\square}{\square}$ my friend receives $\frac{\square}{\square}$ and Mr Hatter receives $\frac{\square}{\square}$