



PART 3

UNIT
5

AUTUMN
second half

FRACTIONS, DECIMALS AND PERCENTAGES

SECTION 1 Fractions

SECTION 2 Fractions and whole numbers

SECTION 3 Decimals

SECTION 4 Common fractions and decimals

SECTION 5 Percentages

SECTION 6 Equivalent fractions

UNIT 5

FRACTIONS, DECIMALS AND PERCENTAGES

SUGGESTED TIME

6 hours

TEACHING OBJECTIVES

- Use fraction notation, including simple mixed numbers, and vocabulary including numerator and denominator.
- Recognise simple equivalent fractions, including tenths and hundredths.
- Change a simple improper fraction into a mixed number.
- Change a simple mixed number into an improper fraction.
- Use decimal notation for tenths and hundredths, and know what each digit represents in numbers with up to two decimal places. 1.8
- Calculate simple fractions of quantities and measurements.
- Begin to understand percentage as the number of parts per 100.
- Calculate simple percentages.
- Solve problems involving fractions and percentages.

SECTION 1 Fractions

SECTION 2 Fractions and whole numbers

SECTION 3 Decimals

SECTION 4 Common fractions and decimals

SECTION 5 Percentages

SECTION 6 Equivalent fractions

HOMEWORK

- Section 5 Star Challenge 5 consolidates equivalent fractions.
- Section 3 Star Challenge 3 reinforces fraction/decimal equivalents.
- Practise finding simple fractions and percentages of quantities.

Unit **5****Checklist for pupils**UNIT
5**Fractions**

You will:

- find fractions of shapes
- order fractions on a number line
- find pairs of fractions that add up to 1

Fractions and whole numbers

You will:

- write fractions using words and numbers
- know how many halves, thirds, quarters, there are in mixed numbers

Decimals

You will:

- use decimal notation for tenths and hundredths
- learn equivalent fractions and decimals

Common fractions and decimals

You will:

- learn the most common equivalent fractions and decimals
- work out halves, quarters and three quarters of amounts
- practise halving and doubling fractions

Percentages

You will:

- work with percentages
- know common fractions as percentages

Equivalent fractions

You will:

- know fractions that are equivalent to $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$

DIRECT TEACHING POINTS

- Quickly revise the language and ideas of fractions. Most pupils will be familiar with fractions as parts of a whole. Demonstrate and emphasise the idea of 'equal parts'. Pupils should recognise what are and what are not, for example, thirds. Discuss exercise 1 with pupils. You may want to use an OHT.
- Extend work on number lines to include fractions. This should be followed up by asking pupils to estimate the position of fractions on a number line as part of interactive mental/oral work. This introduces the idea of ordering fractions.
- Explain how to find a fraction of a quantity. Give pupils practice both mentally and through written questions. This work is followed up in Section 4.
- Pupils should recognise pairs of fractions whose sum is 1. They should link visual pictures, with mental calculations and written statements.
- Most of the exercises can be used to consolidate mental work including finding halves and quarters.
- Star Challenge 1 can be used to introduce equivalent fractions. This is followed up in Section 6.



fraction numerator denominator
half quarter third fifth tenth
hundredth

Fractions

1

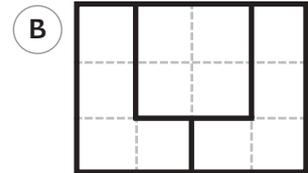
Equal sized shapes

1 If a shape is divided into three parts of equal area, it is divided into thirds.

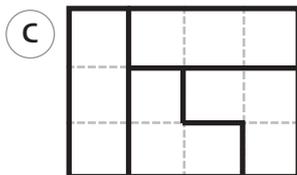
For each shape, say whether it is divided into thirds (YES) or not (NO).



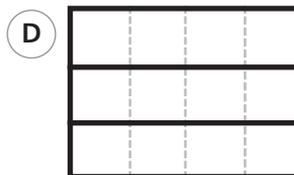
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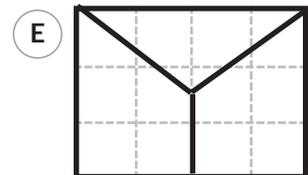
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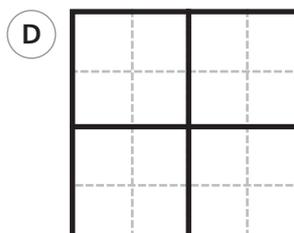
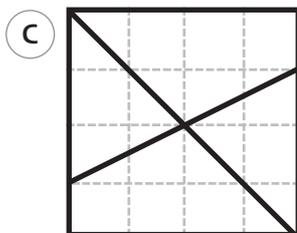
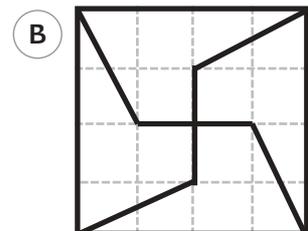
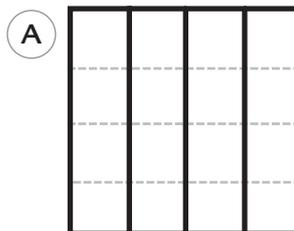


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2 Each of these shapes has been divided into four parts.

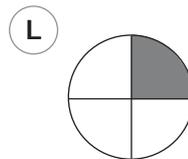
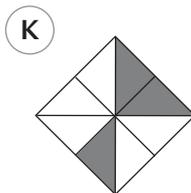
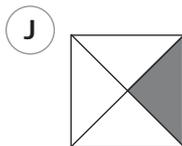
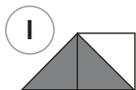
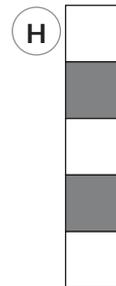
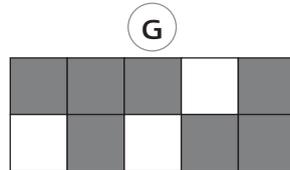
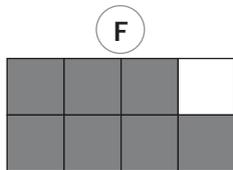
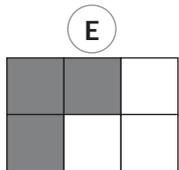
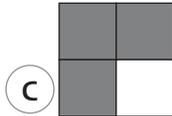
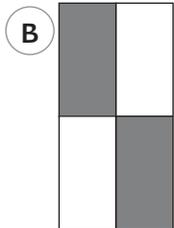
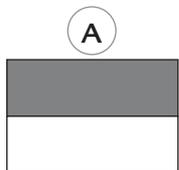
Three of the shapes have been divided into quarters.

Which shape has NOT been divided into quarters?



Fractions

2 Shaded fractions



Complete this table:

Shape	A	B	C	D	E	F	G	H	I	J	K	L
Shaded fraction	$\frac{1}{2}$											
Unshaded fraction												

Fractions

3

Adding up to one

Example



Complete these statements:

- 1 $\frac{2}{3} + \frac{1}{3} = \dots\dots\dots$
- 2 $\frac{3}{5} + \dots\dots\dots = 1$
- 3 $\frac{5}{7} + \dots\dots\dots = 1$
- 4 $\frac{7}{8} + \dots\dots\dots = 1$
- 5 $\frac{3}{10} + \dots\dots\dots = 1$

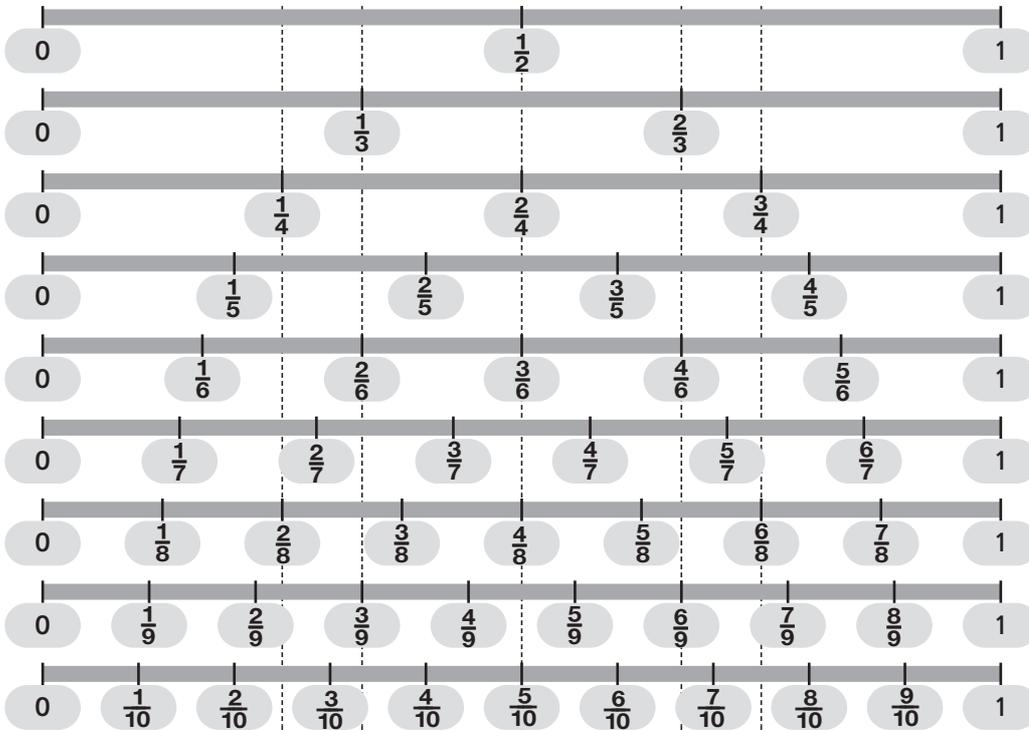
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Related fractions

- 1 I shaded one quarter of a circle. What fraction was unshaded? $\dots\dots\dots$
- 2 Tim drank three-quarters of his drink. What fraction is left? $\dots\dots\dots$
- 3 Ann ate one third of her sweets. What fraction is left? $\dots\dots\dots$
- 4 I spent $\frac{3}{8}$ of my pocket money. What fraction do I have left? $\dots\dots\dots$
- 5 $\frac{4}{5}$ of the crowd support the home team.
What fraction support the away team? $\dots\dots\dots$

Fractions

5 Number lines



- 1 Is $\frac{1}{8}$ bigger or smaller than $\frac{1}{9}$?
- 2 Is $\frac{1}{6}$ bigger or smaller than $\frac{1}{5}$?
- 3 Is $\frac{2}{7}$ bigger or smaller than $\frac{1}{5}$?
- 4 Is $\frac{2}{3}$ bigger or smaller than $\frac{3}{4}$?
- 5 Is $\frac{7}{9}$ bigger or smaller than $\frac{7}{8}$?
- 6 Is $\frac{3}{10}$ bigger or smaller than $\frac{1}{3}$?

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

Circle each fraction here that is smaller than $\frac{1}{2}$.

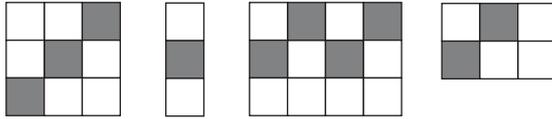
- 8 Which four fractions in the diagram are equal to $\frac{1}{2}$?
- 9 Which two fractions in the diagram are equal to $\frac{2}{3}$?

Fractions

STAR CHALLENGE
5

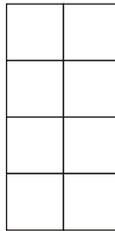
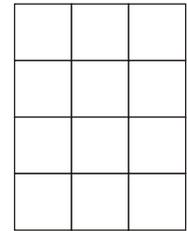
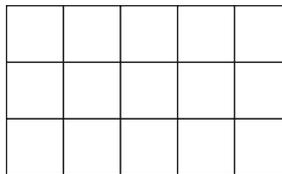
1

How many squares do I shade?

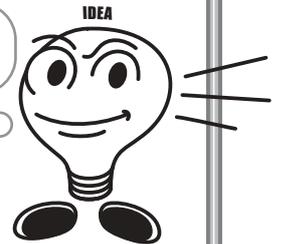
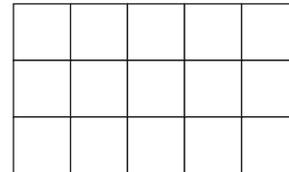
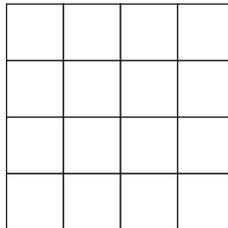
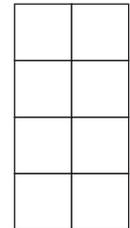
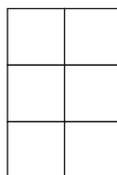
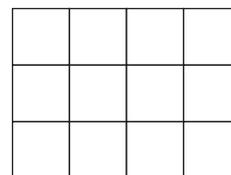
In all these shapes $\frac{1}{3}$ has been shaded.

All correct 1 star

Complete the following:

1 Shade $\frac{1}{4}$ 2 Shade $\frac{3}{4}$ 3 Shade $\frac{1}{5}$ of the rectangle.

1 out of every 5 squares.

4 Shade $\frac{3}{5}$ of this rectangle.5 Shade $\frac{3}{8}$ of this rectangle.6 Shade $\frac{3}{4}$ 7 Shade $\frac{2}{3}$ 8 Shade $\frac{5}{6}$ 

DIRECT TEACHING POINTS

- Make sure that pupils can use the language associated with fractions. Pay attention to the spelling of words, for example, fifth, eighths, half, halves.
- Focus some mental work on division and the interpretation of remainders as fractions.
- Demonstrate the links between complements of 1 in Section 1 exercise 3 and the extension to complements of other whole numbers as in exercise 6 in this section. This can be followed up with mental work.
- Use number lines to demonstrate the relative positions of mixed numbers. Pupils need experience of fractions greater than 1 and their positions within the number system.



*half quarter third fifth tenth
hundredth improper fraction
mixed number*

Fractions and whole numbers

1 Putting fractions into words

- 1 Complete each statement: 2 Draw lines to match words and fractions.

three quarters = $\frac{3}{4}$
 five eighths =
 one seventh =
 = $\frac{1}{10}$
 = $\frac{4}{5}$
 one and a half =

one third $\frac{2}{5}$
 two fifths $1 \frac{1}{4}$
 five sixths $2 \frac{3}{4}$
 one and a quarter $\frac{1}{3}$
 one and three tenths $1 \frac{3}{10}$
 two and three quarters $2 \frac{1}{3}$
 two and a third $\frac{5}{6}$

2 Multiples of simple fractions

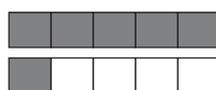
Complete these statements:

1  3 thirds = 1
 $3 \times \frac{1}{3} = \dots\dots$

 4 thirds = $1 \frac{1}{3}$
 $4 \times \frac{1}{3} = \dots\dots$

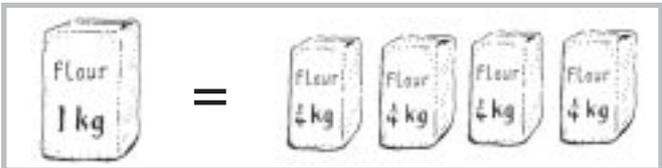
 $6 \times \frac{1}{3} = \dots\dots$

 $5 \times \frac{1}{5} = \dots\dots$

 $6 \times \frac{1}{5} = \dots\dots$

 $8 \times \frac{1}{5} = \dots\dots$

3 Halves and quarters



- | | | |
|----------------------|-----------------------------------|--------------------------------------|
| 1 6 halves = | 6 21 halves = | 11 quarters = $2 \frac{1}{4}$ |
| 2 5 quarters = | 7 15 quarters = | 12 halves = $4 \frac{1}{2}$ |
| 3 14 halves = | 8 7 quarters = | 13 quarters = $1 \frac{3}{4}$ |
| 4 7 halves = | 9 11 halves = | 14 quarters = $3 \frac{1}{2}$ |
| 5 9 quarters = | 10 halves = $3 \frac{1}{2}$ | 15 quarters = $10 \frac{1}{2}$ |

Fractions and whole numbers

4

Changing whole numbers into improper fractions

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

↑ whole number ↑ improper fraction



In 2 whole ones there are 4 halves.

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

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

7 $1 = \frac{\dots}{4}$

2 $7 = \frac{\dots}{2}$

5 $4 = \frac{\dots}{3}$

8 $3 = \frac{\dots}{4}$

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

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

9 $4 = \frac{\dots}{4}$

5

Changing mixed numbers into improper fractions

$$2\frac{1}{3} = \frac{7}{3}$$

↑ mixed number ↑ improper fraction



In $2\frac{1}{3}$ there are 7 thirds.

Complete:

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

4 $7\frac{1}{2} = \frac{\dots}{2}$

7 $5\frac{2}{3} = \frac{\dots}{3}$

2 $3\frac{1}{2} = \frac{\dots}{2}$

5 $1\frac{2}{3} = \frac{\dots}{3}$

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

3 $5\frac{1}{2} = \frac{\dots}{2}$

6 $2\frac{1}{3} = \frac{\dots}{3}$

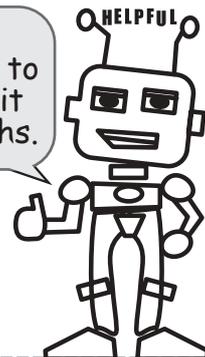
9 $2\frac{3}{4} = \frac{\dots}{4}$

Example

Change $1\frac{4}{5}$ into an improper fraction:

This tells you to change it into fifths.

$$1\frac{4}{5} = \frac{9}{5}$$



Fractions and whole numbers

6

Adding up to whole numbers

Complete these statements:

1 $\frac{7}{12} + \dots = 1$

2 $\frac{4}{5} + \dots = 1$

3 $1\frac{1}{4} + \dots = 2$

4 $1\frac{1}{3} + \frac{2}{3} = \dots$

5 $2\frac{3}{4} + \dots = 3$

6 $2\frac{3}{5} + \dots = 3$

7 $1\frac{3}{8} + \dots = 2$

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

9 $2 - 1\frac{1}{3} = \dots$

10 $3 - 2\frac{1}{5} = \dots$

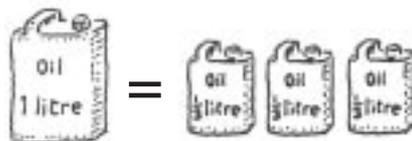
11 $3 - 2\frac{1}{8} = \dots$

12 $2 - \dots = \frac{1}{3}$

STAR CHALLENGE

2

Thirds, fifths and tenths



1 3 thirds = \dots

4 $\frac{10}{3} = \dots$

7 \dots thirds = $1\frac{1}{3}$

2 $\frac{5}{3} = \dots$

5 8 thirds = \dots

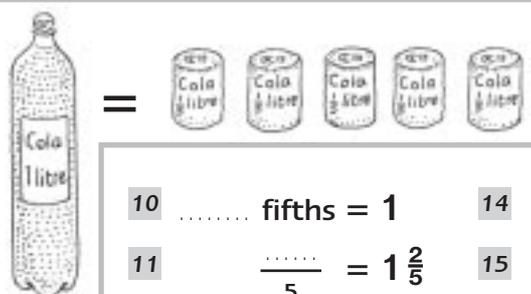
8 $\dots = 2\frac{1}{3}$

3 6 thirds = \dots

6 $\frac{15}{3} = \dots$

9 $\dots = 3\frac{2}{3}$

19-20 correct 2 stars
18 correct 1 star



10 \dots fifths = 1

14 $\frac{\dots}{5} = 2\frac{1}{5}$

18 \dots tenths = $2\frac{1}{10}$

11 $\frac{\dots}{5} = 1\frac{2}{5}$

15 \dots fifths = $3\frac{2}{5}$

19 $\frac{\dots}{10} = 3\frac{4}{10}$

12 \dots fifths = $1\frac{4}{5}$

16 \dots tenths = 1

20 $\frac{\dots}{10} = 1\frac{7}{10}$

13 $\frac{\dots}{5} = 2$

17 $\frac{\dots}{10} = 1\frac{3}{10}$

UNIT 5

SECTIONS 3 AND 4: DECIMALS COMMON FRACTIONS AND DECIMALS

DIRECT TEACHING POINTS

- Build on pupils' understanding of decimals in the context of money and measures.
- Extend place value to decimals. Use place value cards, introduced in Unit 2, to support this work.
- Use number lines to help pupils order decimals. You need to link this work to reading scales and dials. Make sure that numbers greater than 1 are included.
- Consolidate recall of common fraction and decimal equivalents. Halves, quarters, tenths and hundredths need to be committed to memory.
- Demonstrate how to calculate simple fractions of numbers and quantities, including measurements and amounts of money. Section 4 exercises provide mental practice. This work is extended in Unit 13.
- Star Challenge 4 introduces counting on in 'decimal steps'. You can extend this to counting back.



decimal place value
tenth hundredth

Decimals

1

Tenths as fractions and decimals

Write as decimals:

1 $\frac{1}{10} = \dots\dots$

2 $\frac{3}{10} = \dots\dots$

3 $4\frac{9}{10} = \dots\dots$

4 $1\frac{4}{10} = \dots\dots$

5 six tenths = $\dots\dots$

6 three and one tenth = $\dots\dots$

Write as fractions:

7 0.4 = $\dots\dots$

8 1.3 = $\dots\dots$

9 5.9 = $\dots\dots$

10 0.7 = $\dots\dots$

11 10.1 = $\dots\dots$

12 0.2 = $\dots\dots$

tens units tenths



TU.t

$0.6 = \frac{6}{10} = \text{six tenths}$

$2.7 = 2\frac{7}{10} = \text{two and seven tenths}$

2

Tenths and hundredths as fractions and decimals

tens units tenths hundredths

TU.th

$0.6 = \frac{6}{10} = 6 \text{ tenths}$

$0.03 = \frac{3}{100} = 3 \text{ hundredths}$

$0.65 = \frac{65}{100} = 65 \text{ hundredths}$

$5.01 = 5\frac{1}{100} = 5 \text{ and } 1 \text{ hundredth}$

$2.74 = 2\frac{74}{100} = 2 \text{ and } 74 \text{ hundredths}$

Write as decimals:

1 $\frac{5}{100} = \dots\dots$

2 $\frac{71}{100} = \dots\dots$

3 $3\frac{19}{100} = \dots\dots$

4 $1\frac{9}{100} = \dots\dots$

5 one hundredth = $\dots\dots$

6 5 and 7 hundredths = $\dots\dots$

7 $\frac{6}{10} = \dots\dots$

8 $\frac{9}{100} = \dots\dots$

9 $2\frac{3}{10} = \dots\dots$

Write as fractions:

10 0.05 = $\dots\dots$

11 1.36 = $\dots\dots$

12 4.95 = $\dots\dots$

13 0.08 = $\dots\dots$

14 6.14 = $\dots\dots$

15 7.06 = $\dots\dots$

16 0.3 = $\dots\dots$

17 6.04 = $\dots\dots$

18 6.4 = $\dots\dots$

Decimals

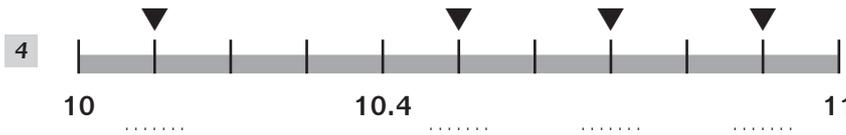
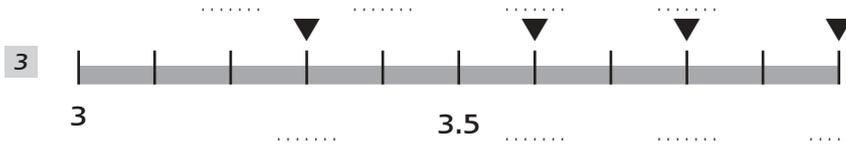
3 Number lines



Fill in the gaps:



Label the numbers that the arrows point to:



Estimate the numbers that the arrows point to:



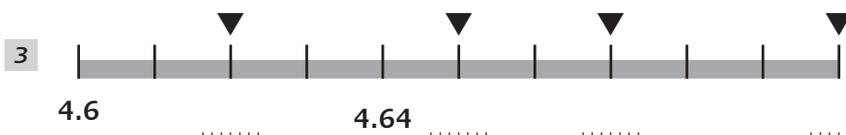
4 Zooming in



Fill in the gaps:



Label the numbers that the arrows point to:



Decimals



3

Matching pairs



13–15 correct 1 star

0.1 has the same value as $\frac{1}{10}$ 0.08 has the same value as $\frac{8}{100}$ 0.85 has the same value as $\frac{85}{100}$

Fractions Decimals

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

2 $\frac{21}{100}$ =

3 = 0.16

4 $\frac{9}{10}$ =

5 = 0.05

Fractions Decimals

6 = 0.7

7 = 0.07

8 $\frac{35}{100}$ =

9 = 0.06

10 = 0.38

Fractions Decimals

11 $\frac{4}{100}$ =

12 $\frac{5}{10}$ =

13 = 0.99

14 $\frac{8}{100}$ =

15 = 0.15



4

Decimal sequences



All correct 1 star

Put in the next THREE terms in each sequence:

1 5.1 5.2 5.3

2 2.63 2.64 2.65

3 4.24 4.26 4.28

4 6.2 6.4 6.6

5 3.5 4.0 4.5

6 2.41 2.42 2.43

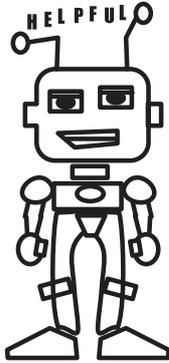
7 4.96 4.95 4.94

8 3.2 3.4 3.6

Common fractions and decimals

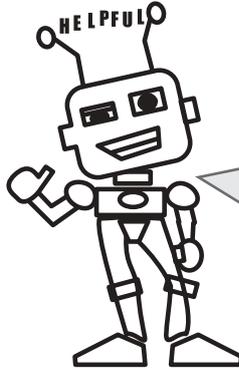
1

Halves, quarters and three quarters of amounts of money



To work out a quarter of an amount,

- halve it
- then halve your answer.



To work out three quarters of an amount:

- work out half of it
- work out a quarter of it
- add your two answers.

- | | | |
|---------------------------------|---------------------------------|---------------------------------|
| 1 $\frac{1}{2}$ of £8 = | 7 $\frac{1}{4}$ of £120 = | 13 $\frac{1}{4}$ of 12p = |
| 2 $\frac{1}{4}$ of £8 = | 8 $\frac{3}{4}$ of £120 = | 14 $\frac{3}{4}$ of 12p = |
| 3 $\frac{3}{4}$ of £8 = | 9 $\frac{3}{4}$ of £100 = | 15 $\frac{3}{4}$ of 80p = |
| 4 $\frac{1}{4}$ of £40 = | 10 $\frac{1}{2}$ of £10 = | 16 $\frac{1}{4}$ of £1 = |
| 5 $\frac{1}{4}$ of £60 = | 11 $\frac{1}{4}$ of £10 = | 17 $\frac{1}{4}$ of 84p = |
| 6 $\frac{1}{2}$ of £120 = | 12 $\frac{3}{4}$ of £10 = | 18 $\frac{3}{4}$ of 84p = |

2

Three quarter problems

- 1 There are 60 minutes in an hour.
 How many minutes are there in a quarter of an hour?
- How many minutes are there in three quarters of an hour?
- 2 There are 8 pints in a gallon.
 How many pints are there in $\frac{3}{4}$ of a gallon?
- 3 Bob's petrol tank holds 40 litres. Today it is $\frac{3}{4}$ full.
 How many litres of petrol are there in it today?
- 4 How many pence are there in $\frac{3}{4}$ of a pound?

Common fractions and decimals

3

Halves, quarters and three quarters



Complete: 1 3.5 = 5 = $9\frac{1}{2}$

$$0.5 = \frac{1}{2}$$

$$2.5 = 2\frac{1}{2}$$

$$7.5 = 7\frac{1}{2}$$

2 5.5 =

6 10.5 =

3 8.5 =

7 = $6\frac{1}{2}$

4 4.5 =

8 = $15\frac{1}{2}$

Complete: 9 2.25 = 13 = $1\frac{1}{4}$

$$0.25 = \frac{1}{4}$$

$$3.25 = 3\frac{1}{4}$$

$$5.25 = 5\frac{1}{4}$$

10 4.25 =

14 6.25 =

11 7.25 =

15 = $8\frac{1}{4}$

12 9.25 =

16 = $14\frac{1}{4}$

Complete: 17 4.75 = 23 = $7\frac{3}{4}$

$$0.75 = \frac{3}{4}$$

$$1.75 = 1\frac{3}{4}$$

$$8.75 = 8\frac{3}{4}$$

18 2.75 =

24 = $10\frac{3}{4}$

19 9.75 =

25 5.5 =

20 3.75 =

26 1.25 =

21 = $6\frac{3}{4}$

27 = $3\frac{1}{2}$

22 5.75 =

28 9.75 =

Common fractions and decimals

4

Mix and match

3.5 has the same value as $3\frac{1}{2}$

$2\frac{3}{4}$ has the same value as 2.75

For each fraction shown, find the decimal which has the same value:

Fraction: Decimal:

..... =

..... =

..... =

..... =

..... =

..... =

..... =

..... =

3.75

2.5

$1\frac{1}{4}$

$3\frac{3}{4}$

7.5

$4\frac{3}{4}$

$1\frac{1}{2}$

1.5

2.25

$7\frac{1}{2}$

4.75

4.25

$2\frac{1}{2}$

$2\frac{1}{4}$

1.25

$4\frac{1}{4}$

Practice makes you better!

PSSST!



Common fractions and decimals



More halves, quarters and three quarters



★ ●

All correct 1 star

- A new pair of trainers costs £40. Sarah's aunt gives her half of this. How much does she give her?
- Adi needs £80 to buy a bike. He has saved a quarter of this. How much does he still need?
- Billy waits three quarters of an hour for the bus. How many minutes does Billy wait?
- Fred has a car. A full petrol tank holds 36 litres. His tank is only one quarter full. (a) How much petrol is in the tank?
(b) Fred fills the tank. How many litres does he put in?
- My friend lives 800 m from my house. I run half the way there and walk the rest. How far do I walk?



Halving and doubling fractions



★ ★ ●

11 correct 2 stars
8-10 correct 1 star

This shows that $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4}$

Complete the following:

- $\frac{1}{2}$ of $\frac{1}{3} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{4} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{5} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{6} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{7} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{8} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{10} = \dots\dots$
- $\frac{1}{2}$ of $\frac{1}{20} = \dots\dots$

Work out:

- $2 \times \frac{1}{6} = \dots\dots$
- $2 \times \frac{1}{8} = \dots\dots$
- $2 \times \frac{1}{5} = \dots\dots$
- $2 \times \frac{1}{6} = \dots\dots$
- $2 \times \frac{1}{7} = \dots\dots$
- $2 \times \frac{1}{10} = \dots\dots$

$\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4}$ so $2 \times \frac{1}{4} = \frac{1}{2}$

UNIT 5

SECTION 5: PERCENTAGES

DIRECT TEACHING POINTS

- Explain percentage as 'the number of parts per 100'. Make sure that you consider simple examples when the number of items is not 100 as in Star Challenge 8.
- Make sure that pupils can recall simple decimal – fraction equivalents as in exercise 2.
- Pupils need to practise finding simple percentages, for example, 25%, 50%, 75%, of numbers and quantities. Introduce some examples that can be done mentally. Unit 13 continues this work.



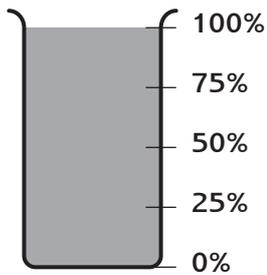
percentage

Percentages

1

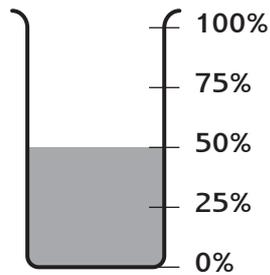
Percentages

Look at these beakers:



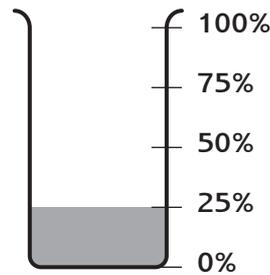
This beaker is full.

It is % full.



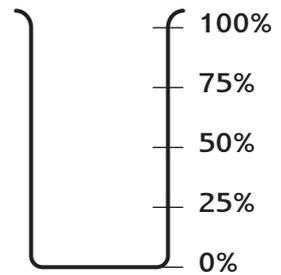
This beaker is half full.

It is % full.



This beaker is a quarter full.

It is % full.



This beaker is empty.

It is % full.

2

Equivalent fractions and percentages

- 1 What fraction is equivalent to 50%?
- 2 What fraction is equivalent to 25%?
- 3 What percentage is equivalent to $\frac{3}{4}$?
- 4 What percentage is equivalent to 1?
- 5 What percentage is equivalent to $\frac{1}{10}$?
- 6 $\frac{3}{10}$ is three times as big as $\frac{1}{10}$.
What percentage is equivalent to $\frac{3}{10}$?
- 7 What percentage is equivalent to $\frac{6}{10}$?
- 8 What fraction is equivalent to 20%?
- 9 40% is more than $\frac{1}{4}$. True or false?
- 10 80% is more than $\frac{3}{4}$. True or false?

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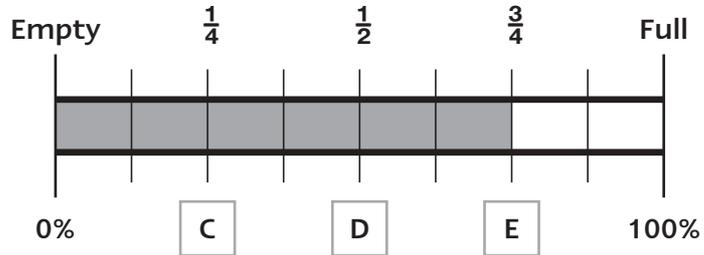
.....

.....

Percentages

3 How much petrol?

Look at this petrol gauge and answer the questions:



- 1 What are the values of C, D and E? C = %
 D = %
 E = %

- 2 How full is the petrol tank?
 Give your answer:
 (a) as a fraction
 (b) as a percentage %

4 Football fans

- 1 At a football match, 70% of the crowd supported the home team. What percentage of the crowd supported the away team? %
- 2 At the match, the hot dog seller sold 95% of his hot dogs. What percentage of his hot dogs did he have left? %
- 3 80% of the crowd was male. What percentage of the crowd was female? %
- 4 30% of the crowd were children. What percentage of the crowd were adults? %
- 5 At the end of the match, 75% of the crowd wanted to sack the manager. What percentage of the crowd did NOT want to sack the manager? %
- 6 What fraction of the crowd wanted to sack the manager?

Percentages



7

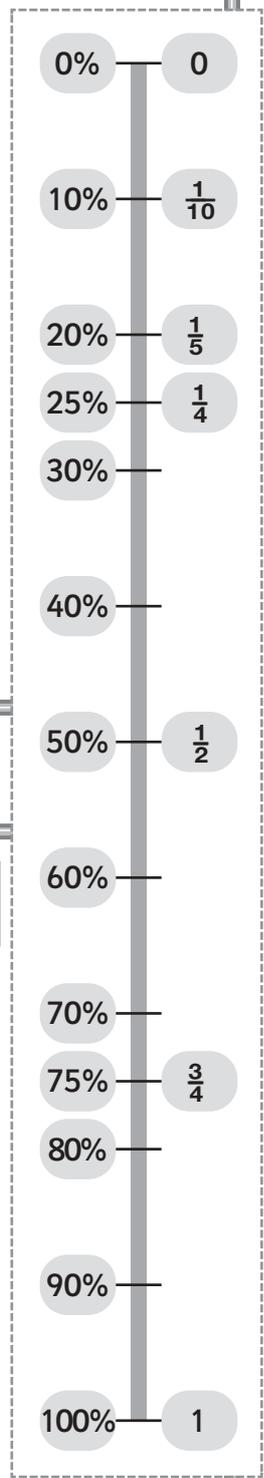
Favourite sports

100 people were asked to vote for their three favourite sports.

- 1 50 (out of 100) voted for tennis.
What fraction of the people voted for tennis?
- 2 What percentage of the people voted for tennis?
- 3 25 people voted for cricket.
What fraction of the people voted for cricket?
- 4 What percentage of the people voted for cricket?
- 5 Three quarters ($\frac{3}{4}$) of the people voted for football.
What percentage of the people voted for football?
- 6 How many people voted for football?
- 7 One fifth ($\frac{1}{5}$) of the people voted for athletics.
What percentage of the people voted for athletics?
- 8 One tenth ($\frac{1}{10}$) of the people voted for rugby.
How many people voted for rugby?



8 correct 2 stars
5-7 correct 1 star



8

The TV survey

Class 7B did a TV survey with 200 pupils in Year 7.

- 1 150 pupils watched the news on TV.
What percentage of the pupils watched the news?
- 2 What fraction of the pupils watched the news?
- 3 What fraction of the pupils do **not** watch the news?
- 4 20 pupils like cookery programmes.
What percentage of the pupils liked cookery programmes?
- 5 What fraction of the pupils liked cookery programmes?
- 6 What fraction of the pupils did **not** like cookery programmes?



7 correct 2 stars
5-6 correct 1 star

UNIT 5

SECTION 6: EQUIVALENT FRACTIONS

DIRECT TEACHING POINTS

- You may want to link Star Challenge 1 in Section 1 to this work on equivalent fractions.
- The focus should be on recognising the patterns in all sets of equivalent fractions. The examples give practice at basic multiplication and division.
- The Star Challenges may provide useful homework activities.



equivalent fractions

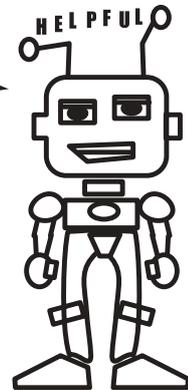
Equivalent fractions

1

Simple equivalent fractions

Fractions which are the same size are called **equivalent fractions**.

The **numerator** is the top number. The **denominator** is the bottom number.



$$\frac{1}{2} = \frac{2}{4} = \frac{5}{10} = \dots$$

The bottom number is TWICE the top.

A Make each of these fractions equivalent to $\frac{1}{2}$:

$\frac{10}{\quad}$	$\frac{5}{\quad}$	$\frac{7}{\quad}$	$\frac{9}{\quad}$	$\frac{\quad}{8}$	$\frac{\quad}{12}$
$\frac{\quad}{25}$	$\frac{45}{\quad}$	$\frac{123}{\quad}$	$\frac{\quad}{60}$		

$$\frac{1}{3} = \frac{2}{6} = \frac{5}{15} = \dots \quad \text{The denominator is THREE times the numerator.}$$

B Make each of these fractions equivalent to $\frac{1}{3}$:

$\frac{10}{\quad}$	$\frac{3}{\quad}$	$\frac{25}{\quad}$	$\frac{7}{\quad}$	$\frac{12}{\quad}$	$\frac{11}{\quad}$	$\frac{\quad}{60}$	$\frac{\quad}{24}$	$\frac{\quad}{45}$	$\frac{\quad}{12}$
--------------------	-------------------	--------------------	-------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------

$$\frac{1}{4} = \frac{2}{8} = \frac{5}{20} = \dots \quad \text{The denominator is FOUR times the numerator.}$$

C Make each of these fractions equivalent to $\frac{1}{4}$:

$\frac{10}{\quad}$	$\frac{3}{\quad}$	$\frac{25}{\quad}$	$\frac{5}{\quad}$	$\frac{\quad}{80}$	$\frac{9}{\quad}$	$\frac{\quad}{48}$	$\frac{\quad}{8}$	$\frac{\quad}{64}$	$\frac{\quad}{60}$
--------------------	-------------------	--------------------	-------------------	--------------------	-------------------	--------------------	-------------------	--------------------	--------------------

Equivalent fractions



STAR CHALLENGE

9

Halves

All correct 1 star

Look in the box below.
 There are 10 fractions
 equivalent to $\frac{1}{2}$ in the box
 (including $\frac{1}{2}$ itself).

Put a round each one.

STAR CHALLENGE

10

Thirds

All correct 1 star

Look in the box below.
 There are 8 fractions
 equivalent to $\frac{1}{3}$ in the box
 (including $\frac{1}{3}$ itself).

Put a round each one.

$\frac{150}{450}$	$\frac{100}{200}$	$\frac{50}{250}$	$\frac{6}{30}$	$\frac{1}{5}$	$\frac{50}{200}$	$\frac{21}{63}$
$\frac{25}{50}$	$\frac{2}{10}$	$\frac{12}{36}$	$\frac{25}{75}$	$\frac{25}{125}$	$\frac{35}{70}$	$\frac{6}{24}$
$\frac{16}{48}$	$\frac{50}{150}$	$\frac{4}{8}$	$\frac{11}{44}$	$\frac{16}{32}$	$\frac{1}{3}$	$\frac{15}{75}$
$\frac{10}{40}$	$\frac{1}{2}$	$\frac{12}{60}$	$\frac{37}{74}$	$\frac{2}{8}$	$\frac{15}{60}$	$\frac{1}{4}$
	$\frac{5}{21}$	$\frac{21}{84}$	$\frac{4}{20}$	$\frac{48}{96}$	$\frac{28}{56}$	
		$\frac{3}{9}$		$\frac{21}{42}$		

STAR CHALLENGE

11

Quarters

All correct 1 star

Look in the box above.
 There are 8 fractions
 equivalent to $\frac{1}{4}$ in the box
 (including $\frac{1}{4}$ itself).

Put a round each one.

STAR CHALLENGE

12

Fifths

7-8 correct 1 star

Look in the box above.
 There are 8 fractions
 equivalent to $\frac{1}{5}$ in the box
 (including $\frac{1}{5}$ itself).

Put a on each one.

Equivalent fractions



13

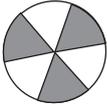
Fraction search for a half

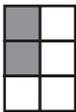


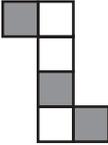
16 of these are equivalent to a half (including $\frac{1}{2}$ itself).
How many can you find?

14-16 correct 2 stars
10-13 correct 1 star

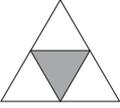
Put a loop around each half.

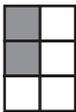






0.2 $\frac{25}{50}$ $\frac{1}{2}$ 50%  $\frac{3}{4}$

$\frac{3}{6}$ 20%  $\frac{50}{100}$ $\frac{4}{8}$ $\frac{2}{5}$ $\frac{10}{20}$

 $\frac{5}{10}$ 0.5 $\frac{12}{22}$



14

Fraction search for a quarter

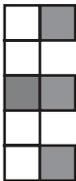


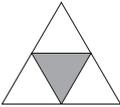
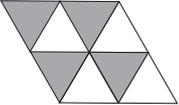
16 of these are equivalent to a quarter (including $\frac{1}{4}$ itself).
How many can you find?

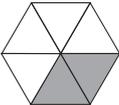
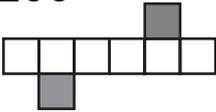
14-16 correct 2 stars
10-13 correct 1 star

Put a loop around each quarter.

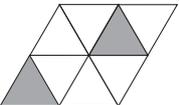




$\frac{4}{16}$ 0.4  $\frac{2}{8}$ 

 $\frac{14}{26}$ $\frac{1}{4}$ $\frac{50}{200}$ 

25% $\frac{25}{100}$ $\frac{11}{44}$ $\frac{5}{20}$ 40% $\frac{15}{75}$

 $\frac{8}{50}$ $\frac{3}{12}$  0.25

Unit 5 Answers

Section 1

Fractions

1 Equal sized shapes

1 A: yes B: yes C: no D: yes E: no 2 C

2 Shaded fractions

A	B	C	D	E	F	G	H	I	J	K	L
$\frac{1}{2}$	$\frac{2}{4} = \frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{3}{6} = \frac{1}{2}$	$\frac{7}{8}$	$\frac{7}{10}$	$\frac{2}{5}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{10}$	$\frac{3}{5}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$

3 Adding up to one

1 $\frac{2}{3} + \frac{1}{3} = 1$ 4 $\frac{7}{8} + \frac{1}{8} = 1$

2 $\frac{3}{5} + \frac{2}{5} = 1$ 5 $\frac{3}{10} + \frac{7}{10} = 1$

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

4 Related fractions

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

5 Number lines

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

Unit 5 Answers

Section 2

Fractions and whole numbers

1 Putting fractions into words

$$\text{three quarters} = \frac{3}{4}$$

$$\text{five eighths} = \frac{5}{8}$$

$$\text{one seventh} = \frac{1}{7}$$

$$\text{one tenth} = \frac{1}{10}$$

$$\text{four fifths} = \frac{4}{5}$$

$$\text{one and a half} = 1\frac{1}{2}$$

$$\text{one third} \quad \frac{2}{5}$$

$$\text{two fifths} \quad 1\frac{1}{4}$$

$$\text{five sixths} \quad 2\frac{3}{4}$$

$$\text{one and a quarter} \quad \frac{1}{3}$$

$$\text{one and three tenths} \quad 1\frac{3}{10}$$

$$\text{two and three quarters} \quad 2\frac{1}{3}$$

$$\text{two and a third} \quad \frac{5}{6}$$

2 Multiples of simple fractions

$$1 \quad 1 \quad 1\frac{1}{3} \quad 2 \quad 2 \quad 1 \quad 1\frac{1}{5} \quad 1\frac{3}{5}$$

3 Halves and quarters

$$1 \quad 3 \quad 6 \quad 10\frac{1}{2} \quad 11 \quad 9$$

$$2 \quad 1\frac{1}{4} \quad 7 \quad 3\frac{3}{4} \quad 12 \quad 9$$

$$3 \quad 7 \quad 8 \quad 1\frac{3}{4} \quad 13 \quad 7$$

$$4 \quad 3\frac{1}{2} \quad 9 \quad 5\frac{1}{2} \quad 14 \quad 14$$

$$5 \quad 2\frac{1}{4} \quad 10 \quad 7 \quad 15 \quad 42$$

4 Changing whole numbers into improper fractions

$$1 \quad \frac{10}{2} \quad 4 \quad \frac{6}{3} \quad 7 \quad \frac{4}{4}$$

$$2 \quad \frac{14}{2} \quad 5 \quad \frac{12}{3} \quad 8 \quad \frac{12}{4}$$

$$3 \quad \frac{3}{3} \quad 6 \quad \frac{9}{3} \quad 9 \quad \frac{16}{4}$$

5 Changing mixed numbers into improper fractions

$$1 \quad \frac{3}{2} \quad 4 \quad \frac{15}{2} \quad 7 \quad \frac{17}{3}$$

$$2 \quad \frac{7}{2} \quad 5 \quad \frac{5}{3} \quad 8 \quad \frac{9}{2}$$

$$3 \quad \frac{11}{2} \quad 6 \quad \frac{7}{3} \quad 9 \quad \frac{11}{4}$$

Unit 5 Answers

Fractions and whole numbers *continued*

6 Adding up to whole numbers

1 $\frac{7}{12} + \frac{5}{12} = 1$

7 $1\frac{3}{8} + \frac{5}{8} = 2$

2 $\frac{4}{5} + \frac{1}{5} = 1$

8 $2 - \frac{1}{4} = 1\frac{3}{4}$

3 $1\frac{1}{4} + \frac{3}{4} = 2$

9 $2 - 1\frac{1}{3} = \frac{2}{3}$

4 $1\frac{1}{3} + \frac{2}{3} = 2$

10 $3 - 2\frac{1}{5} = \frac{4}{5}$

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

11 $3 - 2\frac{1}{8} = \frac{7}{8}$

6 $2\frac{3}{5} + \frac{2}{5} = 3$

12 $2 - 1\frac{2}{3} = \frac{1}{3}$

Section 3

Decimals

1 Tenths as fractions and decimals

1 0.1

4 1.4

7 $\frac{4}{10}$

10 $\frac{7}{10}$

2 0.3

5 0.6

8 $1\frac{3}{10}$

11 $10\frac{1}{10}$

3 4.9

6 3.1

9 $5\frac{9}{10}$

12 $\frac{2}{10}$

2 Tenths and hundredths as fractions and decimals

1 0.05

4 1.09

7 0.6

2 0.71

5 0.01

8 0.09

3 3.19

6 5.07

9 2.3

10 $\frac{5}{100}$

13 $\frac{8}{100}$

16 $\frac{3}{10}$

11 $1\frac{36}{100}$

14 $6\frac{14}{100}$

17 $6\frac{4}{100}$

12 $4\frac{95}{100}$

15 $7\frac{6}{100}$

18 $6\frac{4}{10}$

Accept simplified fractions

Unit 5 Answers

Decimals and fractions *continued*

3 Number lines

1	5.1	5.2	5.3	5.4	5.6	5.7	5.8	5.9	
2	7.2	7.4	7.6	7.8	4	10.1	10.5	10.7	10.9
3	3.3	3.6	3.8	4	5	6.1	6.5	6.8	

4 Zooming in

1	7.41	7.42	7.43	7.44	7.46	7.47	7.48	7.49
2	2.51	2.53	2.55	2.57	2.59			
3	4.62	4.65	4.67	4.7				
4	10.21	10.25	10.27	10.29				

Section 4

Common fractions and decimals

1 Halves, quarters and three quarters of amounts of money

1	£4	6	£60	11	£2.50	16	25p
2	£2	7	£30	12	£7.50	17	21p
3	£6	8	£90	13	3p	18	63p
4	£10	9	£75	14	9p		
5	£15	10	£5	15	60p		

2 Three quarter problems

1	15	45	3	30
2	6		4	75p

Unit 5 Answers

Common fractions and
decimals*continued*

3 Halves, quarters and three quarters

1	$3\frac{1}{2}$	3	$8\frac{1}{2}$	5	9.5	7	6.5
2	$5\frac{1}{2}$	4	$4\frac{1}{2}$	6	$10\frac{1}{2}$	8	15.5
9	$2\frac{1}{4}$	11	$7\frac{1}{4}$	13	1.25	15	8.25
10	$4\frac{1}{4}$	12	$9\frac{1}{4}$	14	$6\frac{1}{4}$	16	14.25
17	$4\frac{3}{4}$	20	$3\frac{3}{4}$	23	7.75	26	$1\frac{1}{4}$
18	$2\frac{3}{4}$	21	6.75	24	10.75	27	3.5
19	$9\frac{3}{4}$	22	$5\frac{3}{4}$	25	$5\frac{1}{2}$	28	$9\frac{3}{4}$

4 Mix and match

$1\frac{1}{4} = 1.25$	$2\frac{1}{2} = 2.5$	$4\frac{3}{4} = 4.75$
$1\frac{1}{2} = 1.5$	$3\frac{3}{4} = 3.75$	$7\frac{1}{2} = 7.5$
$2\frac{1}{4} = 2.25$	$4\frac{1}{4} = 4.25$	

Section 5

Percentages

1 Percentages

A = 50% B = 25%

2 Equivalent fractions and percentages

1	$\frac{1}{2}$	6	30%
2	$\frac{1}{4}$	7	60%
3	75%	8	$\frac{2}{10}$ $\frac{1}{5}$
4	100%	9	T
5	10%	10	T

Unit 5 Answers

Percentages

continued

3 How much petrol?

1 C = 25% D = 50% E = 75%

2 (a) $\frac{3}{4}$ (b) 75%

4 Football fans

1 30% **4** 70%

2 5% **5** 25%

3 20% **6** $\frac{3}{4}$

Section 6

Equivalent fractions

1 Simple equivalent fractions

A

$\frac{10}{20}$	$\frac{5}{10}$	$\frac{25}{50}$	$\frac{7}{14}$	$\frac{45}{90}$	$\frac{9}{18}$	$\frac{123}{246}$	$\frac{4}{8}$	$\frac{30}{60}$	$\frac{6}{12}$
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B

$\frac{10}{30}$	$\frac{3}{9}$	$\frac{25}{75}$	$\frac{7}{21}$	$\frac{12}{36}$	$\frac{11}{33}$	$\frac{20}{60}$	$\frac{8}{24}$	$\frac{15}{45}$	$\frac{4}{12}$
-----------------	---------------	-----------------	----------------	-----------------	-----------------	-----------------	----------------	-----------------	----------------

C

$\frac{10}{40}$	$\frac{3}{12}$	$\frac{25}{100}$	$\frac{5}{20}$	$\frac{20}{80}$	$\frac{9}{36}$	$\frac{12}{48}$	$\frac{2}{8}$	$\frac{16}{64}$	$\frac{15}{60}$
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Unit 5 Answers



1

How many squares do I shade?

All correct 1 star

- 1 any 2 squares shaded
- 2 any 9 squares shaded
- 3 any 3 squares shaded
- 4 any 9 squares shaded
- 5 any 6 squares shaded
- 6 any 6 squares shaded
- 7 any 4 squares shaded
- 8 any 10 squares shaded



2

Thirds, fifths and tenths

19-20 correct 2 stars
18 correct 1 star

- | | |
|------------------|-------|
| 1 1 | 11 7 |
| 2 $1\frac{2}{3}$ | 12 9 |
| 3 2 | 13 10 |
| 4 $3\frac{1}{3}$ | 14 11 |
| 5 $2\frac{2}{3}$ | 15 17 |
| 6 5 | 16 10 |
| 7 4 | 17 13 |
| 8 $\frac{7}{3}$ | 18 21 |
| 9 $\frac{11}{3}$ | 19 34 |
| 10 5 | 20 17 |



3

Matching pairs

13-15 correct 1 star

- | | | |
|--------------------|---------------------|---------------------|
| 1 0.2 | 6 $\frac{7}{10}$ | 11 0.04 |
| 2 0.21 | 7 $\frac{7}{100}$ | 12 0.5 |
| 3 $\frac{16}{100}$ | 8 0.35 | 13 $\frac{99}{100}$ |
| 4 0.9 | 9 $\frac{6}{100}$ | 14 0.08 |
| 5 $\frac{5}{100}$ | 10 $\frac{38}{100}$ | 15 $\frac{15}{100}$ |

Unit 5 Answers

Star Challenge answers *continued*

Decimal sequences

All correct 1 star

1	5.4	5.5	5.6
2	2.66	2.67	2.68
3	4.3(0)	4.32	4.34
4	6.8	7.(0)	7.2
5	5.0	5.5	6.0
6	2.44	2.45	2.46
7	4.93	4.92	4.91
8	3.8	4.0	4.2



More halves, quarters and three quarters

All correct 1 star

1	£20	2	£60	3	45 minutes
4	(a) 9 litres	(b) 27 litres	5	400 m	



Halving and doubling fractions

11 correct 2 stars
8-10 correct 1 star

1	$\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{6}$	5	$\frac{1}{14}$	9	$\frac{1}{3}$
2	$\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$	6	$\frac{1}{16}$	10	$\frac{1}{4}$
3	$\frac{1}{10}$	7	$\frac{1}{20}$	11	$\frac{1}{5}$
4	$\frac{1}{12}$	8	$\frac{1}{40}$		



Favourite sports

8 correct 2 stars
5-7 correct 1 star

1	$\frac{1}{2}$	4	25%	7	20%
2	50%	5	75%	8	10 people
3	$\frac{1}{4}$	6	75 people		

Unit 5 Answers

Star Challenge answers

continued



8

The TV survey

7 correct 2 stars
5-6 correct 1 star

1 75%

4 10%

2 $\frac{3}{4}$

5 $\frac{1}{10}$

3 $\frac{1}{4}$

6 $\frac{9}{10}$



9

Halves: 10 fractions circled as shown.

All correct 1 star

10

Thirds: 8 fractions in rectangles as shown.

All correct 1 star

11

Quarters: 8 fractions in diamonds as shown.

All correct 1 star

12

Fifths: 8 fractions crossed out as shown.

All correct 1 star

$\frac{150}{450}$	$\frac{100}{200}$	$\frac{50}{250}$	$\frac{6}{30}$	$\frac{1}{5}$	$\frac{50}{200}$	$\frac{21}{63}$
$\frac{25}{50}$	$\frac{2}{10}$	$\frac{12}{36}$	$\frac{25}{75}$	$\frac{25}{125}$	$\frac{35}{70}$	$\frac{6}{24}$
$\frac{16}{48}$	$\frac{50}{150}$	$\frac{4}{8}$	$\frac{11}{44}$	$\frac{16}{32}$	$\frac{1}{3}$	$\frac{15}{75}$
$\frac{10}{40}$	$\frac{1}{2}$	$\frac{12}{60}$	$\frac{37}{74}$	$\frac{2}{8}$	$\frac{15}{60}$	$\frac{1}{4}$
	$\frac{5}{21}$	$\frac{21}{84}$	$\frac{4}{20}$	$\frac{48}{96}$	$\frac{28}{56}$	
		$\frac{3}{9}$		$\frac{21}{42}$		

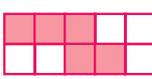
Unit 5 Answers

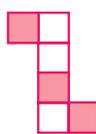
Star Challenge answers *continued*

STAR CHALLENGE
13

Fraction search for a half (answers in red)

14-16 correct 2 stars
10-13 correct 1 star

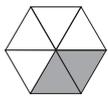




0.2 $\frac{25}{50}$ $\frac{1}{2}$ 50% $\frac{2}{5}$ $\frac{3}{4}$
 $\frac{3}{6}$ 20% $\frac{50}{100}$ $\frac{4}{8}$ $\frac{10}{20}$
 $\frac{5}{10}$ 0.5 $\frac{12}{22}$

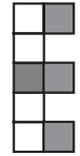
STAR CHALLENGE
14

Fraction search for a quarter (answers in red)

14-16 correct 2 stars
10-13 correct 1 star






$\frac{4}{16}$ $\frac{14}{26}$ $\frac{1}{4}$ 0.4 $\frac{2}{8}$ $\frac{50}{200}$
 $\frac{25}{100}$ $\frac{11}{44}$ $\frac{5}{20}$ 40% $\frac{15}{75}$
 25% $\frac{8}{50}$ $\frac{3}{12}$ 0.25

