

UNIT 13

FRACTIONS, DECIMALS PERCENTAGES, RATIO AND PROPORTION

SUGGESTED TIME

5 hours

TEACHING OBJECTIVES

- Relate fractions to division and find simple fractions and simple percentages of whole number quantities. 
- Order a set of fractions and position them on a number line.
- Order a set of numbers or measurements with the same number of decimal places.
- Use a calculator effectively, for example, to convert fractions to decimals and find fractions of numbers.
- Solve simple problems involving ratio and proportion using informal strategies.

SECTION 1 Fractions of quantities

SECTION 2 Fractions and percentages

SECTION 3 Changing fractions to decimals

SECTION 4 Ordering fractions and decimals

SECTION 5 Ratio and proportion

HOMEWORK

- Find fractions of quantities, using mental, written or calculator methods as appropriate.
- Find percentages of quantities.
- Learn equivalent fractions, decimals and percentages.

Unit **13****Checklist for pupils**UNIT
13

Fractions of quantities

You will:

- work out fractions of amounts of money and other quantities

Fractions and percentages

You will:

- use the connection between fractions and percentages
- work out percentages of quantities

Changing fractions to decimals

You will:

- use decimal equivalents of simple fractions

Ordering fractions and decimals

You will:

- put fractions in order of size
- review place values for tenths and hundredths
- order decimals

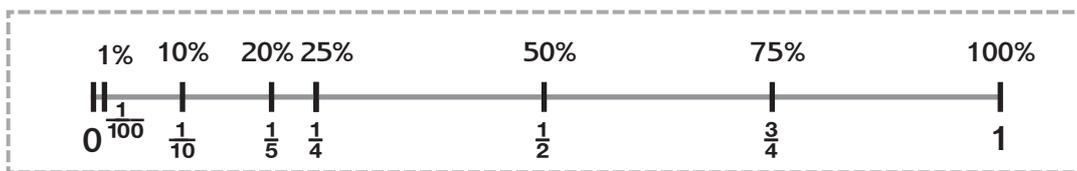
Ratio and proportion

You will:

- solve simple problems involving ratio ('1 for every ...') and proportion ('1 in every ...')
-

DIRECT TEACHING POINTS

- Section 1 exercises 1, 2 and 3 are opportunities to practise mental calculations.
- Pupils need to understand fractions as parts of a whole, positions on a number line and the links with division.
- Star Challenge 2 introduces simple ideas of ratio and proportion (Section 5).
- Revise units of measurement. Section 1 exercise 5 can form the basis of oral work to consolidate these ideas.
- Make sure pupils can recall simple fraction to percentage conversions of a half, quarter, three quarters, tenths, hundredths and then eighths. Section 2 exercise 1 are mental calculations.



- Demonstrate how to deduce percentages, for example, 30%, from 10%. Use exercise 2 to consolidate this work.
- Illustrate and emphasise the links between fractions, decimals and percentages.
- Include some fraction calculations that involve the use of a calculator.



fraction decimal percentage
reduced reduction discount

Fractions of quantities

1

Halves and quarters

To find a quarter ...
...find half of a half.

1 $\frac{1}{2}$ of £48 =

6 $\frac{1}{4}$ of 84 trees =

2 $\frac{1}{4}$ of £48 =

7 $\frac{1}{4}$ of 12 kg =

3 $\frac{1}{2}$ of £60 =

8 $\frac{1}{4}$ of 72p =

4 $\frac{1}{4}$ of £60 =

9 $\frac{1}{4}$ of 804 m =

5 $\frac{1}{4}$ of 20 cm =

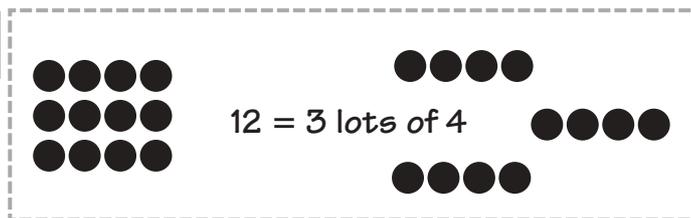
10 $\frac{1}{4}$ of 644 m =



2

Other fractions

Example



1 $12 = 3 \times 4$ so $\frac{1}{3}$ of 12 =

3 $15 = 3 \times 5$ so $\frac{1}{3}$ of 15 =

2 $12 = 6 \times 2$ so $\frac{1}{6}$ of 12 =

4 $20 = 5 \times 4$ so $\frac{1}{5}$ of 20 =

5 $\frac{1}{3}$ of 18 =

9 $\frac{1}{5}$ of 20 =

13 $\frac{1}{6}$ of 24 =

6 $\frac{1}{3}$ of 21 =

10 $\frac{1}{5}$ of 30 =

14 $\frac{1}{8}$ of 24 =

7 $\frac{1}{3}$ of 30 =

11 $\frac{1}{5}$ of 25 =

15 $\frac{1}{10}$ of £50 =

8 $\frac{1}{3}$ of 15p =

12 $\frac{1}{5}$ of £50 =

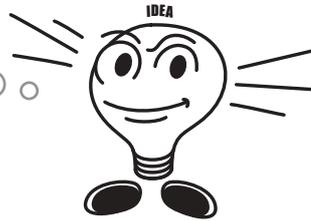
16 $\frac{1}{10}$ of £30 =

Fractions of quantities

3

$\frac{1}{10}$ and its multiples

To find seven tenths
...find a tenth and multiply by 7.



1 $\frac{1}{10}$ of £20 = so $\frac{7}{10}$ of £20 = 4 $\frac{1}{10}$ of £300 = so $\frac{3}{10}$ of £300 =

2 $\frac{1}{10}$ of £50 = so $\frac{3}{10}$ of £50 = 5 $\frac{1}{10}$ of £400 = so $\frac{6}{10}$ of £400 =

3 $\frac{1}{10}$ of £40 = so $\frac{9}{10}$ of £40 =

6 $\frac{1}{10}$ of £30 = 9 $\frac{4}{10}$ of £50 = 12 $\frac{7}{10}$ of £300 =

7 $\frac{3}{10}$ of £100 = 10 $\frac{6}{10}$ of £200 = 13 $\frac{3}{10}$ of £90 =

8 $\frac{2}{10}$ of £20 = 11 $\frac{5}{10}$ of £80 = 14 $\frac{9}{10}$ of £200 =

4

Multiples of simple fractions

1 $\frac{1}{3}$ of £6 = so $\frac{2}{3}$ of £6 =

2 $\frac{1}{3}$ of 9 = so $\frac{2}{3}$ of 9 =

3 $\frac{1}{3}$ of 30 = so $\frac{2}{3}$ of 30 =

4 $\frac{1}{4}$ of £8 = so $\frac{3}{4}$ of £8 =

5 $\frac{1}{4}$ of £12 = so $\frac{3}{4}$ of £12 =

6 $\frac{1}{5}$ of £20 = so $\frac{2}{5}$ of £20 =

7 $\frac{1}{4}$ of £100 = so $\frac{3}{4}$ of £100 =

8 $\frac{1}{3}$ of £150 = so $\frac{2}{3}$ of £150 =

9 $\frac{1}{5}$ of £100 = so $\frac{4}{5}$ of £100 =

To find
two thirds
...find a third
and double it.



To find
three quarters
...find a quarter
and multiply by 3.



Fractions of quantities

5

Fractions of time and length

1 $\frac{1}{2}$ hour = minutes 4 $\frac{1}{2}$ day = hours

2 $\frac{1}{4}$ hour = minutes 5 $\frac{1}{4}$ day = hours

3 $\frac{1}{3}$ hour = minutes 6 $\frac{1}{3}$ day = hours

1 foot = 12 inches

7 $\frac{1}{2}$ foot = inches 8 $\frac{1}{4}$ foot = inches 9 $\frac{1}{3}$ foot = inches

STAR CHALLENGE

1

More difficult fractions



9 correct 2 stars
7-8 correct 1 star

1 $\frac{1}{4}$ of £20 = so $\frac{3}{4}$ of £20 =

2 $\frac{1}{3}$ of £21 = so $\frac{2}{3}$ of £21 =

3 $\frac{1}{5}$ of £40 = so $\frac{3}{5}$ of £40 =

4 $\frac{2}{3}$ of £900 = 7 $\frac{3}{8}$ of £40 =

5 $\frac{5}{6}$ of £72 = 8 $\frac{3}{4}$ of £48 =

6 $\frac{3}{5}$ of £20 = 9 $\frac{2}{3}$ of £618 =

Fractions of quantities



Fractions in action



7-8 correct 1 star

- 1 How many centimetres are there in $\frac{3}{4}$ of a metre?

- 2 A full bottle of squash contains 750 millilitres.
Two thirds of the squash has been drunk.
How many millilitres are left?

- 3 Fred and Rashida painted the Youth Club.
Fred did one third of the work.
Rashida did the rest.
They were paid £30.
Fred got paid one third of the money.
 - (a) How much did Fred get paid?
 - (b) What fraction of the work did Rashida do?
 - (c) How much did Rashida get paid?

- 4 Mary and Alison dug Mrs Brown's garden.
Mary worked for 2 hours.
Alison worked for 6 hours.
They got paid £24 for the whole job.
 - (a) What fraction of the work did Mary do?
 - (b) How much should she get paid?
 - (c) How much should Alison get?

Fractions and percentages

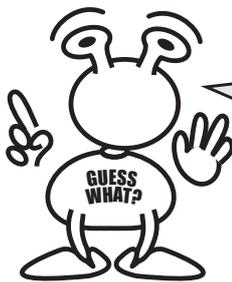
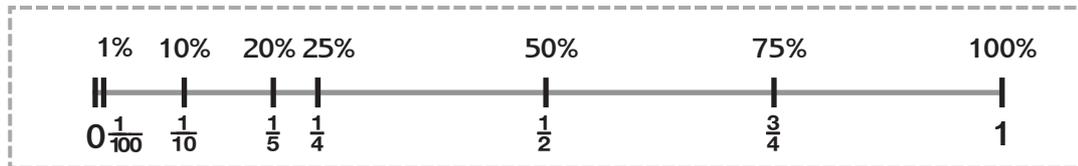
1

Using fractions to find percentages



Example

Fractions can also be expressed as percentages:



50% of an amount is the same as half of that amount.

Complete these calculations:

1 50% of £20 =

2 50% of £14 =

3 50% of £5 =

Learn: $25\% = \frac{1}{4}$

4 25% of 12p = 6 25% of £20 = 8 25% of £200 =

5 25% of 48 = 7 25% of 60p = 9 25% of £120 =

Learn: $10\% = \frac{1}{10}$

10 10% of 50p = 11 10% of £100 = 12 10% of £20 =

13 50% of 40 m = 15 10% of 40 m = 17 10% of £450 =

14 25% of 40 m = 16 25% of £80 =

2

10% and its multiples



1 10% of £20 =

2 30% of £20 =

3 10% of £50 =

4 70% of £50 =

5 10% of £400 =

6 40% of £400 =

7 20% of 30 kg =

8 60% of 200 m =

9 30% of 500 kg =

10 80% of 1200 m =

Fractions and percentages



Reducing prices



11-12 correct 2 stars
9-10 correct 1 star

CD
£12

SALE PRICE
25% off

- 1 How much is the price reduced by?
- 2 What is the sale price of the CD?

Trainers
£12

SALE PRICE
50% off

- 3 What is the reduction?
- 4 What is the sale price?

TV
£300

SALE PRICE
10% discount

- 5 How much is the discount?
- 6 What is the sale price?

Video tape
£10

SALE PRICE
Price reduced by 10%

- 7 How much is the reduction?
- 8 What is the sale price?

Shirt
£20

SALE PRICE
 $\frac{1}{4}$ off

- 9 How much is the reduction?
- 10 What is the sale price?

Jacket
£20

SALE PRICE
20% off

- 11 How much is the price reduced by?
- 12 What is the sale price?



Percentages and fractions



11-12 correct 2 stars
9-10 correct 1 star

1 $\frac{1}{4}$ of £480 =

7 $\frac{1}{8}$ of 560 m =

2 50% of £368 =

8 25% of 840 g =

3 $\frac{1}{3}$ of £570 =

9 $\frac{1}{10}$ of 3700 km =

4 25% of £128 =

10 50% of 25 kg =

5 $\frac{1}{5}$ of £1250 =

11 $\frac{1}{6}$ of £474 =

6 10% of £640 =

12 20% of £60 =

SECTIONS 3 AND 4: CHANGING FRACTIONS TO DECIMALS ORDERING FRACTIONS AND DECIMALS

DIRECT TEACHING POINTS

- Consolidate pupils' understanding of place value to include decimals.
- Simple fraction to decimal conversions – half, quarter, three quarters, tenths, hundredths and eighths – should be learnt. Consolidate through oral work.

Change these fractions into decimals:

1 $\frac{1}{10} = \dots\dots\dots$ 3 $\frac{5}{10} = \dots\dots\dots$ 5 $\frac{1}{100} = \dots\dots\dots$ 7 $\frac{5}{100} = \dots\dots\dots$
 2 $\frac{3}{10} = \dots\dots\dots$ 4 $\frac{9}{10} = \dots\dots\dots$ 6 $\frac{3}{100} = \dots\dots\dots$ 8 $\frac{8}{100} = \dots\dots\dots$

Complete these statements by filling in the boxes:

9 $\frac{4}{10} = 0. \square$ 11 $\frac{6}{\square} = 0.6$ 13 $\frac{7}{100} = 0. \square$ 15 $\frac{2}{\square} = 0.02$
 10 $\frac{\square}{10} = 0.2$ 12 $\frac{\square}{\square} = 0.7$ 14 $\frac{\square}{100} = 0.06$ 16 $\frac{\square}{\square} = 0.19$

- Demonstrate the relative sizes of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and so on. Consolidate by asking pupils to identify fractions on a number line.

Place in order, with the smallest first:

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

- Oral work, involving counting forward or back in equal steps, can help consolidate ordering.

Continue each sequence:

1 1.6 1.8 2 2.2
 2 1.3 1.5 1.7 1.9
 3 1.1 1.4 1.7
 4 3.4 3.6 3.8

Place in order, with the smallest first:

5 1.4 2.3 3.1 1.3 1.9 2.7
 6 2.3 3.2 2.1 2.9 4.3 3.8
 7 4.2 2.4 6.2 5.3 4.9 2.1

- Rounding is best related to placing a number on a number line and deciding which boundary is closest. Model this process.
- You may choose to spread work from this section throughout the unit.



fraction decimal percentage tenth hundredth
 order smallest largest halfway

Changing fractions to decimals

1

Changing fractions into decimals



Example

Change $\frac{4}{5}$ into a decimal.



press these keys

Calculator display



Change these fractions into decimals.
You should know some of them.

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

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

5 $\frac{3}{20} = \dots\dots$

7 $\frac{5}{8} = \dots\dots$

2 $\frac{7}{40} = \dots\dots$

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

6 $\frac{6}{50} = \dots\dots$

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

9 Now use a calculator to turn $\frac{1}{7}$, $\frac{2}{7}$, $\frac{3}{7}$, $\frac{4}{7}$, $\frac{5}{7}$ and $\frac{6}{7}$ into decimals, and list the answers below.

.....

.....

.....

.....

.....

.....

.....

What pattern can you see in the answers?

.....

.....

Changing fractions to decimals

STAR CHALLENGE
5

The first fraction-decimal challenge



13 correct 2 stars
12 correct 1 star

Complete these tables:

1	Fraction	$\frac{3}{5}$	$\frac{4}{10}$	$\frac{5}{25}$	$\frac{6}{20}$	$\frac{9}{40}$	$\frac{3}{16}$	$\frac{16}{10}$
	Decimal							

Each represents a whole number.

2	Fraction	$\frac{\square}{5}$	$\frac{\square}{10}$	$\frac{\square}{100}$	$\frac{\square}{20}$	$\frac{\square}{25}$	$\frac{\square}{10}$
	Decimal	0.8	0.9	0.05	0.15	0.32	1.4

STAR CHALLENGE
6

The second fraction-decimal challenge



12 correct 2 stars
11 correct 1 star

Complete these tables:

1	Fraction	$\frac{9}{10}$	$\frac{13}{100}$	$\frac{27}{100}$	$\frac{19}{100}$	$\frac{43}{1000}$	$\frac{181}{1000}$	$\frac{3}{1000}$
	Decimal							

Each represents a whole number.

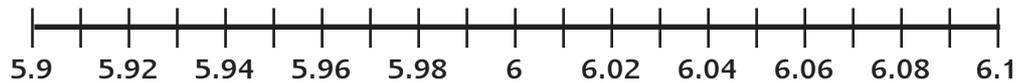
2	Fraction	$\frac{\square}{10}$	$\frac{\square}{100}$	$\frac{\square}{1000}$	$\frac{\square}{1000}$	$\frac{\square}{1000}$
	Decimal	0.3	0.49	0.231	0.019	0.007

Ordering fractions and decimals

2

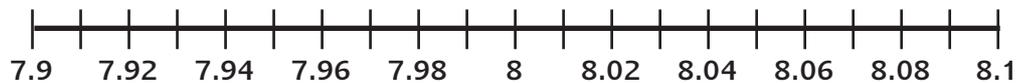
Ordering decimals

Fill in the next four terms in each sequence:



1 5.94 5.96 5.98 6

2 5.9 5.93 5.96 5.99



3 7.96 7.99 8.02

4 7.91 7.95 7.99

5 2.45 2.47 2.49

6 2.42 2.45 2.48

Place these numbers in order with the smallest first:

7 2.45 2.47 2.42 3.1 2.4 2.5

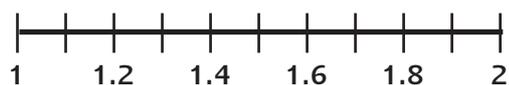
8 3.25 3.2 3.23 3.16 2.95 3.5

9 3.41 3.14 3.44 3.15 1.34 3.43

3

Halfway between

Write in a number that is halfway between each pair of numbers:



1 1 2 5 8.2 8.8 9 6.48 6.52

2 1.2 1.4 6 4.6 5 10 7.94 7.98

3 1.5 1.9 7 6.4 6.5 11 2.48 2.52

4 2.6 3 8 6.42 6.48 12 4.6 4.7

Ordering fractions and decimals



Decimal sequences



8 correct 2 stars
6-7 correct 1 star

Write in the next four terms in each sequence:

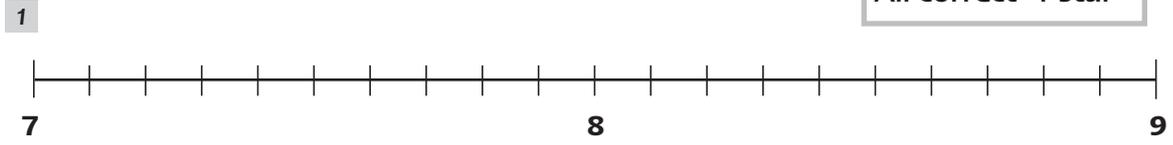
- | | | | | | | | |
|---|------|------|------|-------|-------|-------|-------|
| 1 | 5 | 5.5 | 6 | ..... | ..... | ..... | ..... |
| 2 | 3.7 | 4 | 4.3 | ..... | ..... | ..... | ..... |
| 3 | 2.15 | 2.18 | 2.21 | ..... | ..... | ..... | ..... |
| 4 | 2 | 2.02 | 2.04 | ..... | ..... | ..... | ..... |
| 5 | 10.1 | 10.3 | 10.5 | ..... | ..... | ..... | ..... |
| 6 | 8.2 | 8.4 | 8.6 | ..... | ..... | ..... | ..... |
| 7 | 8.02 | 8.04 | 8.06 | ..... | ..... | ..... | ..... |
| 8 | 4.85 | 4.87 | 4.89 | ..... | ..... | ..... | ..... |



Putting numbers in their place



All correct 1 star



- 7.5 8.3 7.9 8.8 7.1

Put these numbers in the correct places on the line above.
Use arrows to mark their positions clearly.



- 3.85 3.89 3.92 3.99 3.95

Put these numbers in the correct places on the line above.
Use arrows to mark their positions clearly.

UNIT 13

SECTION 5: RATIO AND PROPORTION

DIRECT TEACHING POINTS

- Explain ratio as '1 for every ...' and proportion as '1 in every ...'.
- Demonstrate these ideas using objects.
- Link this work to the examples on fractions in Section 1.



ratio proportion

Ratio and proportion

1 In every ... and for every ...



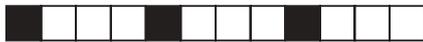
1 1 in every 3 squares is black.

Fill in the gaps below:

- (a) in every 6 squares are black.
- (b) in every 12 squares are black.
- (c) 3 in every squares are black.
- (d) 10 in every squares are black.

2 Fill in the gaps in this grid:

Number of black squares	Number of white squares
1	2
2	4
3	.....
4	.....
.....	10
.....	14
.....	20



3 1 in every 4 squares is black.

Fill in the gaps:

Number of black squares	Number of white squares
1	3
2	6
3	.....
5	.....
.....	21
.....	33

4 In Hope Badminton Club, there are 3 girls for every 1 boy. There are 5 boys in the club.

How many girl members are there?

.....

How many members are there altogether?

.....

5 In Hope Snooker Club, there are 3 boys for every 2 girls. There are 20 girl members.

How many boy members are there?

.....

How many members are there altogether?

.....

Ratio and proportion**2****Ratio and the words that go with it****Example**

For every 1 red bead, there are 2 blue beads.

The number of blue beads is twice the number of red beads.

The number of red beads is half the number of blue beads.

The ratio of red to blue is 1 to 2 or 1 : 2.

Green beads	Yellow beads	Total number of beads
1	3	4
2	.....	.....
3	.....	.....
.....	15	.....
.....	21	.....

For every green bead there are yellow beads.

The number of green beads is the number of yellow beads.

The ratio of green beads to yellow beads is to

Ratio and proportion

3 Proportion

1 **R** **B** **B** **R** **B** **B** **R** **B** **B** **R** **B** **B** ...

1 in every 3 beads is red or $\frac{1}{3}$ are red.

The ratio of red to blue is 1 to 2
 The proportion of red beads is $\frac{1}{3}$
 The proportion of blue beads is $\frac{2}{3}$

(a) Fill in the gaps below:

Red beads	Blue beads	Total number of beads
1	2	3
2	4	6
10	.....	.....
15	.....	.....
.....	40	.....

2 **R** **B** **B** **R** **B** **B** **R** **B** **B** **R** **B** **B** ...

(a) If you know the number of red beads, how do you work out the number of blue beads?

.....

(b) If you know the number of blue beads, how do you work out the number of red beads?

.....

3 **R** **B** **B** **B** **R** **B** **B** **B** **R** **B** **B** **B** ...

In a necklace like this, 1 in every 4 beads is red or $\frac{1}{4}$ are red.

(a) Fill in the gaps below:

Red beads	Blue beads	Total number of beads
1	3	4
2	6	8
.....	.....	12
.....	.....	20

(b) What proportion of the beads is blue?

.....

Ratio and proportion



9

Ratio and proportion problems



All correct 1 star

- 1 Mike is saving up to go skiing.

Mike's father gives him £4 for every £1 that Mike earns.

Fill in the spaces in the grid.

Mike's money	Father's money	Total money
£1	£4	£5
£2	£8	£10
£5	.....	.....
.....	£40	.....
.....	.....	£100

For every £1 Mike earns, his father gives him £

The amount his father gives Mike is the amount Mike earns.

The ratio of father's money to Mike's earnings is to

- 2 Laura is mixing red and white paint to make pink.

For every can of red paint, she needs three cans of white.

With two cans of red paint, she needs cans of white paint.

The number of cans of white paint is times the number of cans of red paint.

She needs 12 cans of pink paint.

How many cans of red paint should she start with?

Unit 13 Answers

Section 1

Fractions of quantities

1 Halves and quarters

- | | | | | | | | | | |
|---|-----|---|-----|---|----------|---|------|----|-------|
| 1 | £24 | 3 | £30 | 5 | 5 cm | 7 | 3 kg | 9 | 201 m |
| 2 | £12 | 4 | £15 | 6 | 21 trees | 8 | 18p | 10 | 161 m |

2 Other fractions

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

3 $\frac{1}{10}$ and its multiples

- | | | | | | |
|---|-----------|----|------|----|------|
| 1 | £2, £14 | 6 | £3 | 11 | £40 |
| 2 | £5, £15 | 7 | £30 | 12 | £210 |
| 3 | £4, £36 | 8 | £4 | 13 | £27 |
| 4 | £30, £90 | 9 | £20 | 14 | £180 |
| 5 | £40, £240 | 10 | £120 | | |

4 Multiples of simple fractions

- | | | | | | |
|---|--------|---|--------|---|-----------|
| 1 | £2, £4 | 4 | £2, £6 | 7 | £25, £75 |
| 2 | 3, 6 | 5 | £3, £9 | 8 | £50, £100 |
| 3 | 10, 20 | 6 | £4, £8 | 9 | £20, £80 |

5 Fractions of time and length

- | | | | | | |
|---|----|---|----|---|---|
| 1 | 30 | 4 | 12 | 7 | 6 |
| 2 | 15 | 5 | 6 | 8 | 3 |
| 3 | 20 | 6 | 8 | 9 | 4 |

Unit 13 Answers

Section 2

Fractions and percentages

1 Using fractions to find percentages

- | | | | |
|---------|-------|---------|--------|
| 1 £10 | 6 £5 | 11 £10 | 16 £20 |
| 2 £7 | 7 15p | 12 £2 | 17 £45 |
| 3 £2.50 | 8 £50 | 13 20 m | |
| 4 3p | 9 £30 | 14 10 m | |
| 5 12 | 10 5p | 15 4 m | |

2 10% and its multiples

- | | | | | |
|------|-------|--------|---------|----------|
| 1 £2 | 3 £5 | 5 £40 | 7 6 kg | 9 150 kg |
| 2 £6 | 4 £35 | 6 £160 | 8 120 m | 10 960 m |

Section 3

Changing fractions to decimals

1 Changing fractions into decimals

- | | | | |
|---------|--|--------|---------|
| 1 0.2 | 3 0.4 | 5 0.15 | 7 0.625 |
| 2 0.175 | 4 0.125 | 6 0.12 | 8 0.375 |
| 9 | 0.142857, 0.285714, 0.428571, 0.571428, 0.714285, 0.857142 | | |

They all have the same digits, in the same order, but starting with a different digit.

Section 4

Ordering fractions and decimals

1 Tenths and hundredths

- | | | |
|----------------------|-----------------------------------|------------------------------------|
| 1 (a) sixty | 5 $\frac{40}{100} = \frac{4}{10}$ | 8 $\frac{6}{10} = \frac{60}{100}$ |
| (b) seven tenths | | |
| 2 (a) zero tenths | 6 $\frac{30}{100} = \frac{3}{10}$ | 9 $\frac{1}{10} = \frac{10}{100}$ |
| (b) eight hundredths | | |
| 3 seven tenths | 7 $\frac{70}{100} = \frac{7}{10}$ | 10 $\frac{9}{10} = \frac{90}{100}$ |
| 4 seven hundredths | | |

Unit 13 Answers

Ordering fractions and
decimals*continued*

2 Ordering decimals

1	6.02	6.04	6.06	6.08		
2	6.02	6.05	6.08	6.11		
3	8.05	8.08	8.11	8.14		
4	8.03	8.07	8.11	8.15		
5	2.51	2.53	2.55	2.57		
6	2.51	2.54	2.57	2.6		
7	2.4	2.42	2.45	2.47	2.5	3.1
8	2.95	3.16	3.2	3.23	3.25	3.5
9	1.34	3.14	3.15	3.41	3.43	3.44

3 Halfway between

1	1.5	3	1.7	5	8.5	7	6.45	9	6.5	11	2.5
2	1.3	4	2.8	6	4.8	8	6.45	10	7.96	12	4.65

Section 5

Ratio and proportion

1 In every ... and for every ...

1 (a) 2 (b) 4 (c) 9 (d) 30

2

	Black	White
	1	2
	2	4
	3	6
	4	8
	5	10
	7	14
	10	20

3

	Black	White
	1	3
	2	6
	3	9
	5	15
	7	21
	11	33

4 15 20 5 30 50

Unit 13 Answers

 UNIT
13

Ratio and proportion *continued*

2 Ratio and the words that go with it

1	Green	Yellow	Total
	1	3	4
	2	6	8
	3	9	12
	5	15	20
	7	21	28

For every green bead there are **3** yellow beads.

The number of green beads is **one third** the number of yellow beads.

The ratio of green beads to yellow beads is **1 : 3**.

3 Proportion

1	Red	Blue	Total
	1	2	3
	2	4	6
	10	20	30
	15	30	45
	20	40	60

2 (a) Number of blue beads = double the number of red beads.

(b) Number of red beads = half the number of blue beads.

3 (a)	Red	Blue	Total	(b) $\frac{3}{4}$
	1	3	4	
	2	6	8	
	3	9	12	
	5	15	20	

Unit 13 Answers

Star Challenge answers



1

More difficult fractions

- | | | | | | |
|---|---------|---|------|---|------|
| 1 | £5, £15 | 4 | £600 | 7 | £15 |
| 2 | £7, £14 | 5 | £60 | 8 | £36 |
| 3 | £8, £24 | 6 | £12 | 9 | £412 |

9 correct	2 stars
7-8 correct	1 star



2

Fractions in action

- | | | | | | |
|---|--------|---|-------------------|-------------------|---------|
| 1 | 75 cm | 3 | (a) £10 | (b) $\frac{2}{3}$ | (c) £20 |
| 2 | 250 ml | 4 | (a) $\frac{1}{4}$ | (b) £6 | (c) £18 |

7-8 correct	1 star
-------------	--------



3

Reducing prices

- | | | | | | |
|---|----|---|------|----|-----|
| 1 | £3 | 5 | £30 | 9 | £5 |
| 2 | £9 | 6 | £270 | 10 | £15 |
| 3 | £6 | 7 | £1 | 11 | £4 |
| 4 | £6 | 8 | £9 | 12 | £16 |

11-12 correct	2 stars
9-10 correct	1 star



4

Percentages and fractions

- | | | | | | |
|---|------|---|-------|----|---------|
| 1 | £120 | 5 | £250 | 9 | 370 km |
| 2 | £184 | 6 | £64 | 10 | 12.5 kg |
| 3 | £190 | 7 | 70 m | 11 | £79 |
| 4 | £32 | 8 | 210 g | 12 | £12 |

11-12 correct	2 stars
9-10 correct	1 star



5

The first fraction-decimal challenge

1	Decimal	0.6	0.4	0.2	0.3	0.225	0.1875	1.6
2	Fraction	$\frac{4}{5}$	$\frac{9}{10}$	$\frac{5}{100}$	$\frac{3}{20}$	$\frac{8}{25}$	$\frac{14}{10}$	

13 correct	2 stars
12 correct	1 star



6

The second fraction-decimal challenge

1	Decimal	0.9	0.13	0.27	0.19	0.043	0.181	0.003
2	Fraction	$\frac{3}{10}$	$\frac{49}{100}$	$\frac{231}{1000}$	$\frac{19}{1000}$	$\frac{7}{1000}$		

12 correct	2 stars
11 correct	1 star

Unit **13** AnswersUNIT
13Star Challenge answers *continued*

Decimal sequences

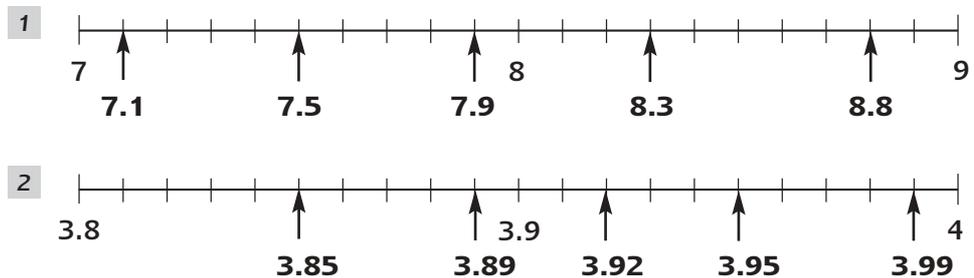
8 correct 2 stars
6-7 correct 1 star

1	6.5	7	7.5	8
2	4.6	4.9	5.2	5.5
3	2.24	2.27	2.3	2.33
4	2.06	2.08	2.1	2.12
5	10.7	10.9	11.1	11.3
6	8.8	9	9.2	9.4
7	8.08	8.1	8.12	8.14
8	4.91	4.93	4.95	4.97



Putting numbers in their place

All correct 1 star



Ratio and proportion problems

All correct 1 star

1	Mike's money	Father's money	Total money
	£1	£4	£5
	£2	£8	£10
	£5	£20	£25
	£10	£40	£50
	£20	£80	£100

For every £1 Mike earns, his father gives him **£4**.

The amount his father gives Mike is **four times** the amount Mike earns.

The ratio of father's money to Mike's earnings is **4 to 1**.

2 With two cans of red paint, she needs **6** cans of white paint.

The number of cans of white paint is **3** times the number of cans of red paint.

How many cans of red paint should she start with? **3**

