Collins

Step 1

Maths Frameworking

Intervention Workbook

Chris Pearce

Developed in partnership with

The Colne Community School & College

Ofsted Outstanding School 2012|2013

Name _____

Class _____

Collins

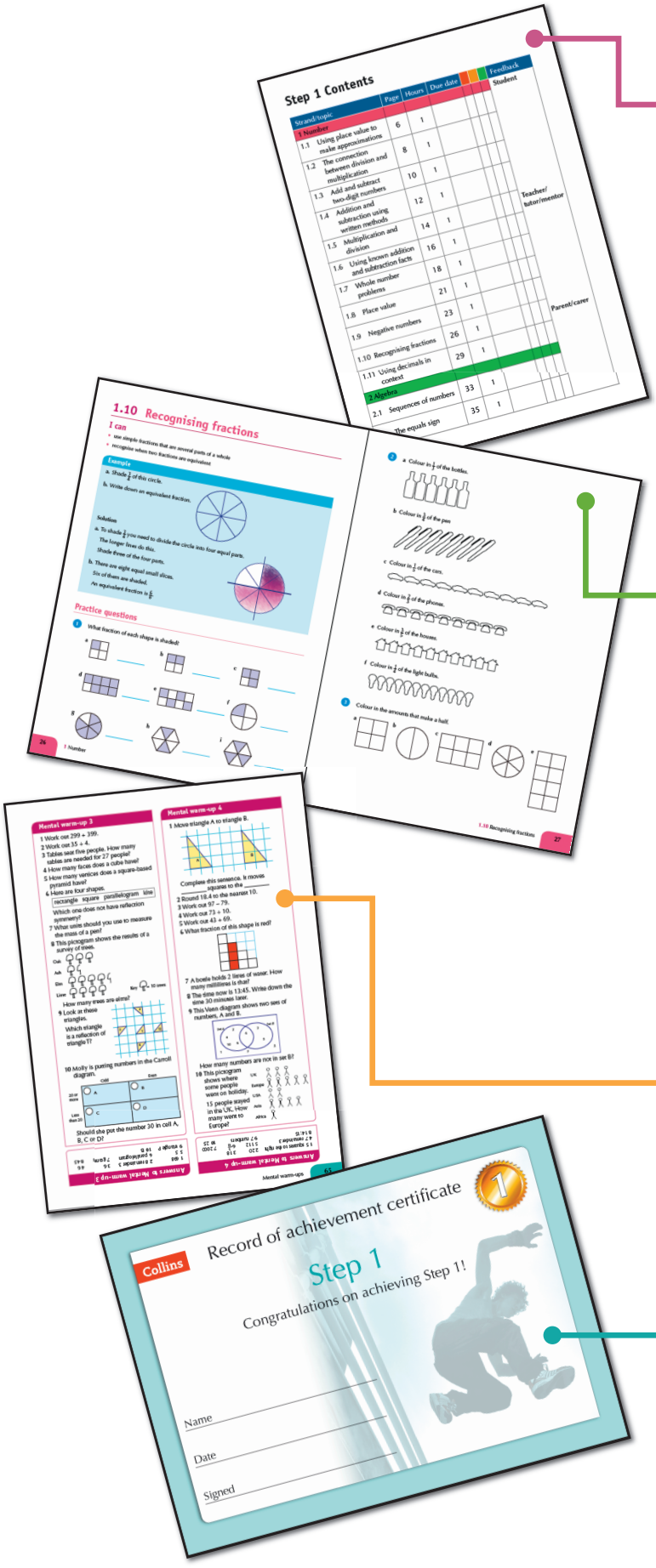
Step 1

Maths Frameworking

Intervention Workbook

Chris Pearce

How to use this book



Organise your learning

The Contents table at the start of the Workbook shows the topics you are going to cover.

- Your teacher or tutor can set a date for you to complete each topic by.
- You can give a traffic light colour for each topic to show how you feel it went.
- You, your teacher and your parent or carer can write comments.

Work through each topic step by step

For each topic, there are:

- Clear learning objectives
- Worked examples to show you how to answer the questions
- Practice questions to help you consolidate what you have learnt. A glossary and answers are available on the Collins website.

At the end of each chapter, there's a comments box for your teacher or tutor to fill in on how you did.

Practise your mental maths

Try the mental maths questions at the end of the Workbook to see what you have learned.

Celebrate your progress

When you finish the Workbook, your teacher or tutor can fill in the Record of achievement certificate for you to keep.

Step 1 Contents

1 Number

1.1 Using place value to make approximations

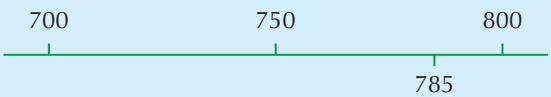
I can

- round any positive integer less than 1000 to the nearest 10 or 100
- round some four-digit numbers to the nearest 1000

Example

The price of a second-hand car is £785. Round this number to the nearest 100.

Solution



785 is between 700 and 800.

750 is halfway between 700 and 800.

785 is larger than 750.

7 is the hundreds digit in 785.

It is closer to 800 than it is to 700.

785 is 800 to the nearest 100.

Practice questions

1 Round each of these numbers to the nearest 10.

a 64 _____ **b** 72 _____ **c** 89 _____

d 23 _____ **e** 65 _____ **f** 14 _____

g 26 _____ **h** 31 _____ **i** 25 _____

j 77 _____ **k** 66 _____ **l** 34 _____

2 Round each of these numbers to the nearest 100.

a 734 _____ **b** 576 _____ **c** 212 _____

d 788 _____ **e** 899 _____ **f** 150 _____

g 129 _____ **h** 233 _____ **i** 643 _____

j 349 _____ **k** 743 _____ **l** 379 _____

3 Round each of these numbers to the nearest 1000.

a 3400 _____ **b** 1200 _____ **c** 7800 _____

d 8900 _____ **e** 6100 _____ **f** 6500 _____

g 9200 _____ **h** 5500 _____ **i** 6800 _____

j 3200 _____ **k** 4500 _____ **l** 1300 _____

4 Round the prices in this table to the nearest £10 and £100. The first one has been done for you.

Price	To the nearest £10	To the nearest £100
£339	**£340**	**£300**
£182		
£715		
£528		
£891		
£219		
£665		

1.2 The connection between division and multiplication

I can

- use multiplication facts to write down associated division facts

Example

Here is a multiplication fact: **12 × 9 = 108**

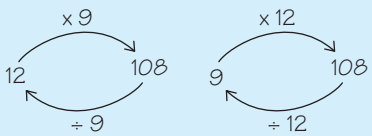
Use this to write down two division facts.

Solution

One fact is 108 ÷ 9 = 12 *because twelve 9s make 108.*

Another fact is 108 ÷ 12 = 9 *because nine 12s make 108.*

If you are given a multiplication fact you can always write down two division facts.



Practice questions

1 Here is a multiplication fact: 7 × 8 = 56

Write down these answers. 56 ÷ 7 = _____ 56 ÷ 8 = _____

2 Here is a multiplication fact: 6 × 12 = 72

Write down these answers. 72 ÷ 6 = _____ 72 ÷ 12 = _____

3 Look at this multiplication: 15 × 5 = 75

Use this to write down two divisions. _____ and _____.

4 Here are some multiplication facts:

$9 \times 7 = 63$ $12 \times 7 = 84$ $13 \times 4 = 52$ $16 \times 5 = 80$

Use them to complete these divisions.

$84 \div 12 =$ _____ $52 \div 4 =$ _____ $80 \div 5 =$ _____ $63 \div 9 =$ _____

5 Here are some multiplication facts:

$2 \times 50 = 100$ $4 \times 25 = 100$ $5 \times 20 = 100$ $10 \times 10 = 100$

Use them to complete these divisions.

$100 \div 2 =$ _____ $100 \div 5 =$ _____ $100 \div 10 =$ _____

$100 \div 4 =$ _____ $100 \div 50 =$ _____ $100 \div 20 =$ _____

1.3 Add and subtract two-digit numbers

I can

- add and subtract two-digit numbers in my head

Example

a Add together this pair of numbers. 52 + 29

b Subtract this pair of numbers. 52 – 29

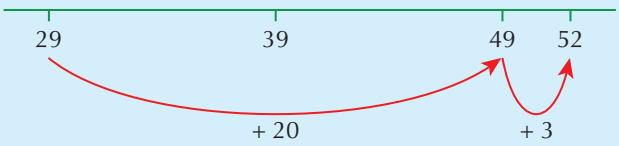
Solution

a 50 + 20 = 70 Add the tens of each number.

2 + 9 = 11 Add the units of each number.

70 + 11 = 81 Then add the two separate answers.

b You can draw or imagine a line if you wish.



Count on from 29 to 52.

From 29 to 49 is 20.

From 49 to 52 is 3.

52 – 29 = 20 + 3 = 23

You may know different methods. Use those if you prefer them.

Practice questions

1 Add together each pair of numbers.

a 47 + 21 = _____ **b** 57 + 35 = _____ **c** 62 + 32 = _____

d 76 + 54 = _____ **e** 47 + 34 = _____ **f** 56 + 32 = _____

g 72 + 41 = _____ **h** 88 + 33 = _____ **i** 96 + 21 = _____

2 Work out these subtractions.

a 47 – 21 = _____ **b** 57 – 35 = _____ **c** 62 – 32 = _____

d 76 – 54 = _____ **e** 47 – 34 = _____ **f** 56 – 32 = _____

g 72 – 41 = _____ **h** 88 – 33 = _____ **i** 96 – 21 = _____

3 Use any method to work out these additions and subtractions.

a 70 + 34 = _____ **b** 70 – 34 = _____ **c** 66 + 23 = _____

d 66 – 23 = _____ **e** 46 + 39 = _____ **f** 46 – 39 = _____

g 67 + 21 = _____ **h** 67 – 21 = _____

1.4 Addition and subtraction using written methods

I can

- add and subtract three-digit numbers using written methods

Example

a Work out this addition. 654 + 183

b Work out this subtraction. 654 – 183

Solution

Write the numbers in columns.

a

$$\begin{array}{r} 654 \\ +\,183 \\ \hline 837 \\ \hline {\scriptstyle 1} \end{array}$$

First add the units: 4 + 3 = 7.

Then add the tens: 5 + 8 = 13; write down 3, carry 1.

Now add the hundreds: 6 + 1 + 1 carried = 8.

The answer is 837.

b

$$\begin{array}{r} {\scriptstyle 5}\not{6}\,{\scriptstyle 1}5\,4 \\ -\,183 \\ \hline 471 \end{array}$$

First subtract the units: 4 – 3 = 1.

Then subtract the tens: 5 is smaller than 8, so borrow from the hundreds and do 15 – 8 = 7.

Now subtract the hundreds: 5 – 1 = 4

The answer is 471.

Practice questions

1 Use a written method to work out these additions. Show your working.

a 174 + 75 = _____ **b** 345 + 128 = _____ **c** 173 + 566 = _____

d 286 + 45 = _____ **e** 365 + 209 = _____ **f** 376 + 545 = _____

g 75 + 333 = _____ **h** 208 + 334 = _____ **i** 265 + 716 = _____

2 Use a written method to work out these subtractions. Show your working.

a 286 – 142 = _____ **b** 765 – 234 = _____ **c** 718 – 34 = _____

d 174 – 57 = _____ **e** 362 – 149 = _____ **f** 634 – 509 = _____

g 977 – 326 = _____ **h** 423 – 66 = _____ **i** 265 – 119 = _____

1.5 Multiplication and division

I can

- multiply and divide two-digit numbers by 2, 3, 4 or 5
- divide two-digit numbers by 2, 3 4 or 5, including remainders

Example

a Work out this multiplication. 78 x 3

b Work out this division. 78 ÷ 3

Solution

Write out the calculations neatly.

a

$$\begin{array}{r} 78 \\ \times\ \ 3 \\ \hline 234 \\ {\scriptstyle 2} \end{array}$$

First 8 × 3 = 24; write down 4, carry 2.

Then 7 × 3 = 21; 21 + 2 carried = 23.

The answer is 234.

b

$$3\overline{)\,7\,{}^{1}8}\ \ 26$$

First 7 ÷ 3 = 2 remainder 1.

Then 18 ÷ 3 = 6.

The answer is 26.

You should know the multiplication tables for 2, 3, 4, and 5.

Practice questions

1 Work out these multiplications. Show your working.

a 37 x 2 = _____ **b** 19 x 5 = _____ **c** 23 x 3 = _____

d 62 x 3 = _____ **e** 74 x 4 = _____ **f** 55 x 5 = _____

g 58 x 4 = _____ **h** 32 x 8 = _____ **i** 54 x 8 = _____

2 Work out these divisions. Show your working.

a 48 ÷ 2 = _____ **b** 46 ÷ 3 = _____ **c** 60 ÷ 4 = _____

d 63 ÷ 5 = _____ **e** 54 ÷ 3 = _____ **f** 62 ÷ 5 = _____

g 95 ÷ 4 = _____ **h** 75 ÷ 5 = _____ **i** 87 ÷ 2 = _____

1.6 Using known addition and subtraction facts

I can

- recall addition and subtraction facts up to 20
- use known facts to solve problems involving larger numbers

Example

Work out the following additions and subtraction.

a 65 + 7 **b** 88 – 30 **c** 63 + 26

Solution

Look for easy methods, like these:

a 65 is 60 + 5 60 + 5 + 7 = 60 + 12 = 72

b 8 – 3 = 5 so 80 – 30 = 50 and 88 – 30 = 50 + 8 = 58

c 63 + 26 = 60 + 3 + 20 + 6 = 60 + 20 + 3 + 6 = 80 + 9 = 89

You can probably do these in your head. There is no need to write them out.

Practice questions

1 Work out these additions.

a 7 + 12 = _____ **b** 13 + 14 = _____ **c** 13 + 6 = _____

d 44 + 30 = _____ **e** 50 + 35 = _____ **f** 65 + 4 = _____

g 216 + 13 = _____ **h** 350 + 14 = _____ **i** 257 + 13 = _____

2 Work out these subtractions.

a 19 – 7 = _____ **b** 18 – 6 = _____ **c** 17 – 13 = _____

d 90 – 30 = _____ **e** 73 – 30 = _____ **f** 82 – 50 = _____

g 92 – 40 = _____ **h** 106 – 30 = _____ **i** 114 – 40 = _____

3 Add together these numbers.

a 15 and 16 _____ **b** 25 and 16 _____ **c** 7 and 13 _____

d 17 and 13 _____ **e** 7, 8 and 9 _____ **f** 7, 18 and 19 _____

4 Fill in the missing number in these calculations.

a _____ + 7 = 18 **b** 24 – _____ = 15 **c** 13 + _____ = 37

d _____ – 18 = 9 **e** 23 – _____ = 9 **f** 14 + _____ = 59

5 Look at the numbers in the box, then answer the questions.

40	50	60	70	90	120	140	160

a Write down two numbers that add to make 100. _____ and _____

b Write down two numbers with a sum of 200. _____ and _____

c Write down two numbers with a difference of 40. _____ and _____

d Write down two numbers with a difference of 90. _____ and _____

1.7 Whole number problems

I can

- decide which operation to use to solve a problem
- solve division problems with remainders

Example

There are 32 people waiting to travel in a taxi.

Each taxi can take five passengers.

How many taxis do they need?

Solution

This is a division question because you have to divide the group of people up between the taxis.

$32 \div 5 = 6$ remainder 2

They can fill six taxis but there are still two people left over.

They need seven taxis.

Practice questions

1 Work out these divisions. They all have remainders.

a $29 \div 4 =$ _____ remainder _____ **b** $31 \div 5 =$ _____ remainder _____

c $15 \div 2 =$ _____ remainder _____ **d** $20 \div 3 =$ _____ remainder _____

2 There are 23 biscuits in a packet. Four people share them equally.

How many does each person have? _____ biscuits

3 There are five cereal bars in a box. Jasmine buys eight boxes.

How many cereal bars does Jasmine buy? _____ bars

4 There are 45 guests at a meal. They are sitting at tables. Each table can seat six people.

How many tables are needed? _____ tables

5 Ali, Rob and Carol are looking at how much money they have. Ali has £32, Rob has £14 and Carol has £57.

a How much do they have all together? _____

b How much more than Rob does Carol have? _____

c Carol has six two-pound coins and the rest is in five-pound notes.

Work out how many five-pound notes she has. _____

d Carol and Rob put their money together and share it out equally between the two of them.

How much does each one get? _____

6 Mintees are sweets that come in packets of 36

a Work out the number of Mintees in five packets. _____ Mintees

b If five people share one packet equally, how many Mintees will each person get?

_____ Mintees

c Merry has a packet of Mintees. He eats 14 and gives five away. How many are left?

_____ Mintees

7 A bus has 52 seats and 23 passengers. At a bus stop four people get off and 12 get on.

How many empty seats are there on the bus? _____ empty seats

8 There are eight seats in a large taxi.

How many taxis are needed to carry 50 people? _____ taxis

1.8 Place value

I can

- understand place value in numbers up to thousands

Example

Here is a number: 1062

a Write the number in words.

b Write down the tens digit.

Solution

a The number is one thousand and sixty-two.

b The tens digit is 6. *The 1 is the thousands digit, the 0 is the hundreds digit and the 2 is the units digit.*

Practice questions

1 Write these numbers in figures.

a twenty-seven _____

b thirty-four _____

c one hundred and fifty-two _____

d three hundred and eight _____

e seven hundred and forty _____

f one thousand two hundred and three _____

2 Write these numbers in words.

a 35 _____

b 179 _____

c 204 _____

d 990 _____

e 1678 _____

3 Write down

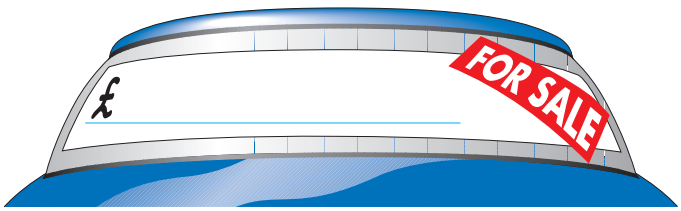
a the tens digit in 3412. _____

b the hundreds digit in 3052. _____

c the units digit in three hundred and sixty-seven. _____

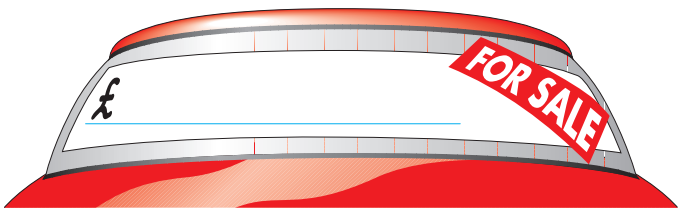
4 Write the price of each car on its windscreen in numbers.

a



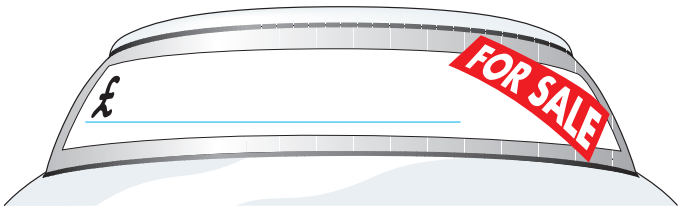
two thousand five hundred pounds

b



one thousand one hundred and ninety-nine pounds

c



two thousand and ninety-nine pounds

5 Which is the cheapest car in Question 4?

_____

1.9 Negative numbers

I can

- order a set of positive and negative numbers
- calculate a temperature rise and fall across 0 °C

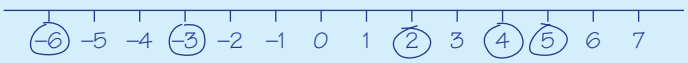
Example

Here are some temperatures in degrees C: **2, –3, 4, 5, –6**

Put them in order, from lowest to highest.

Solution

You can draw a number line to help you,and mark the numbers on it.



The lowest are on the left, the highest are on the right.

In order they are –6, –3, 2, 4, 5.

Practice questions

1 Here are some sets of temperatures in degrees C.

Put each set of temperatures in order, from lowest to highest.

a 2, 7, –2, 3, –3, 0 _____

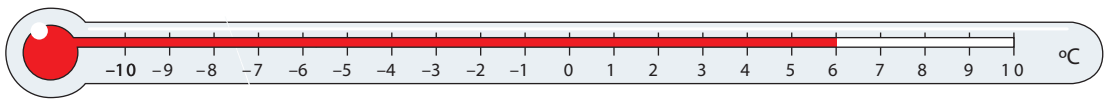
b –7, 4, –5, 6, 2 _____

c 9, 6, –5, 4, –3, 0 _____

d 6, 4, –2, –3, 9, –1 _____

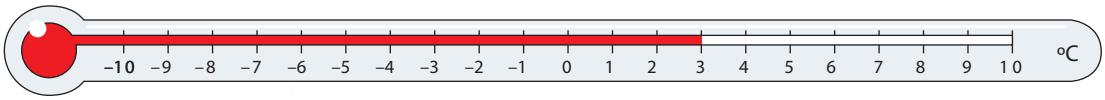
2 Look at the thermometers and answer the questions.

a



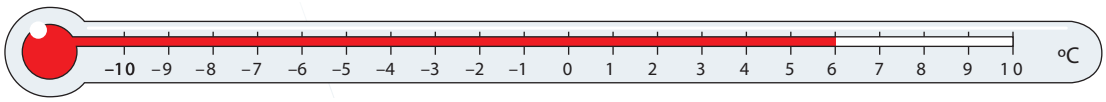
If the temperature increases by 3 °C what will the temperature be? _____°C

b



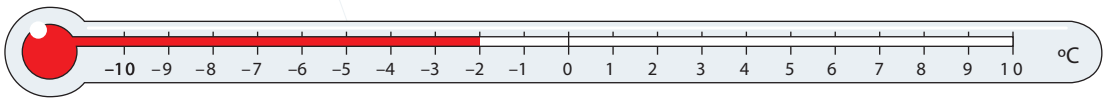
If the temperature falls by 5 °C what will the temperature be? _____ °C

c



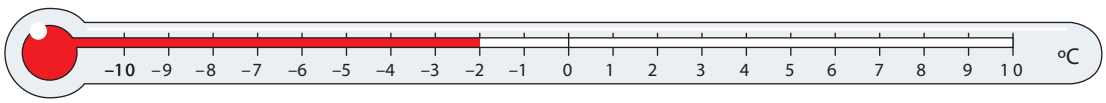
If the temperature falls by 4 °C what will the temperature be? _____ °C

d



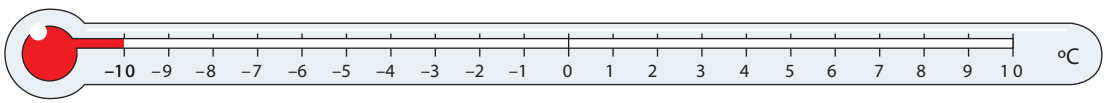
If the temperature increases by 6 °C what will the temperature be? _____ °C

e



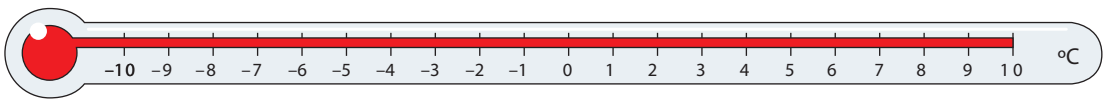
If the temperature increases by 2 °C what will the temperature be? _____ °C

f



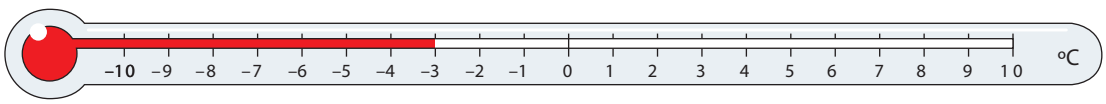
If the temperature increases by 15 °C what will the temperature be? _____ °C

g



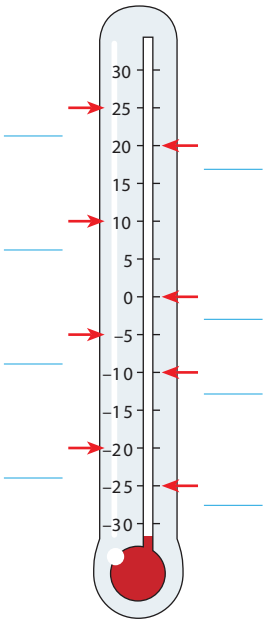
If the temperature decreases by 20 °C what will the temperature be? _____ °C

h



If the temperature increases by 12 °C what will the temperature be? _____ °C

3 Write down the temperatures shown on the thermometer.



4 Fill in the missing numbers on the number lines.

a

b

c

d

1.10 Recognising fractions

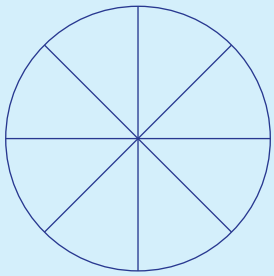
I can

- use simple fractions that are several parts of a whole
- recognise when two fractions are equivalent

Example

a Shade $\frac{3}{4}$ of this circle.

b Write down an equivalent fraction.

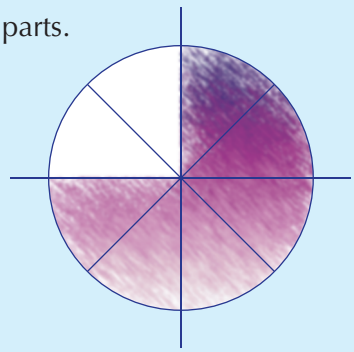


Solution

a To shade $\frac{3}{4}$ you need to divide the circle into four equal parts.

The longer lines do this.

Shade three of the four parts.



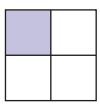
b There are eight equal small slices.

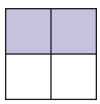
Six of them are shaded.

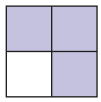
An equivalent fraction is $\frac{6}{8}$.

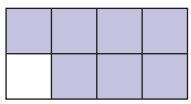
Practice questions

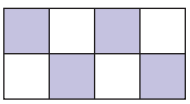
1 What fraction of each shape is shaded?

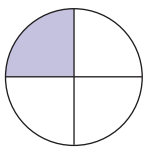
a  _____

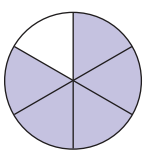
b  _____

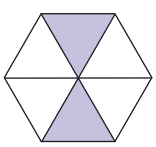
c  _____

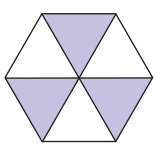
d  _____

e  _____

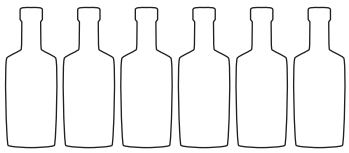
f  _____

g  _____

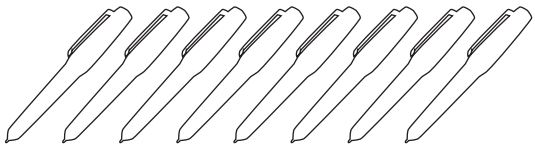
h  _____

i  _____

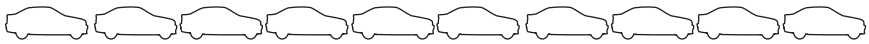
2 **a** Colour in $\frac{1}{3}$ of the bottles.



b Colour in $\frac{3}{4}$ of the pen



c Colour in $\frac{1}{5}$ of the cars.

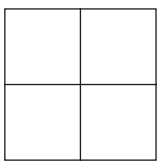


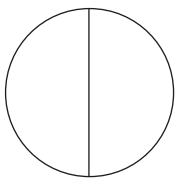
d Colour in $\frac{2}{3}$ of the phones.

e Colour in $\frac{3}{5}$ of the houses.

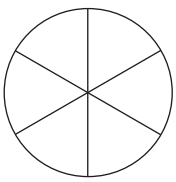
f Colour in $\frac{1}{4}$ of the light bulbs.

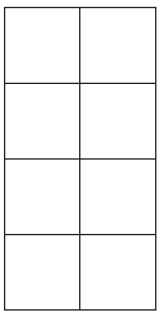
3 Colour in the amounts that make a half.

a 

b 

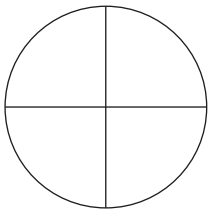
c 

d 

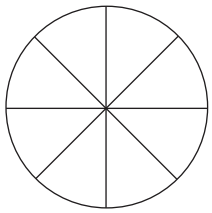
e 

4 Colour in the amounts that make a quarter.

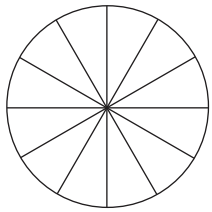
a



b

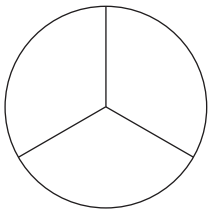


c

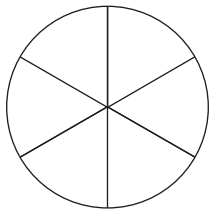


5 Colour in the equivalent fractions for a third.

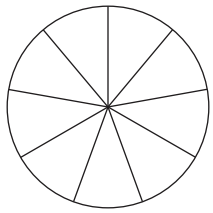
a



b

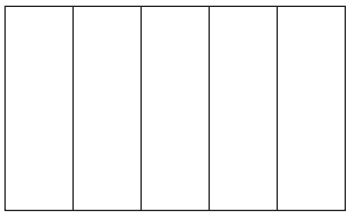


c

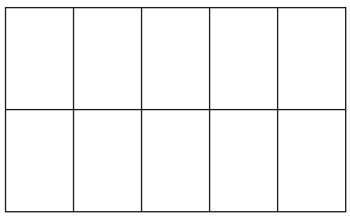


6 Colour in the equivalent fractions for a fifth.

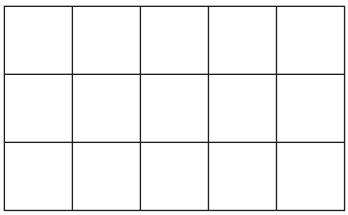
a



b



c



1.11 Using decimals in context

I can

- use decimals and understand place value in decimals in a context, such as money

Example

a Write 1620 pence in pounds.

b Write 124 millimetres in centimetres.

Solution

a There are 100 pence in one pound.

1620 pence = 16 pounds and 20 pence = £16.20.

b There are 10 millimetres in one centimetre.

124 millimetres = 12 centimetres and 4 millimetres = 12.4 centimetres.

Practice questions

1 **a** Write down the amount of money in each of the piles below. Give your answers in pounds.




_____ _____ _____ _____

b Put a circle around the largest amount. Put a square around the smallest amount.

2 Write these amounts of money in pounds.

a 250 pence = £ _____

b 408 pence = £ _____

c 1287 pence = £ _____

d 4000 pence = £ _____

3 Write these amounts in pence.

a £7 = _____ pence

b £12.50 = _____ pence

c £0.80 = _____ pence

d £0.05 = _____ pence

4 45 millimetres is equal to 4.5 centimetres.

Write these lengths in centimetres.

a 23 mm = _____ cm

b 51 mm = _____ cm

c 60 mm = _____ cm

d 8 mm = _____ cm

5 5.6 centimetres is equal to 56 millimetres.

Write these lengths in millimetres.

a 6.2 cm = _____ mm

b 12.5 cm = _____ mm

c 25 cm = _____ mm

d 0.2 cm = _____ mm

6 Write the tenths from 0 to 1 as decimals.

7 Fill in the missing numbers on the number lines. The first one has been done for you.

a

b

c

d

8 Write the hundredths from 0 to 0.1 as decimals.

9 Fill in the missing numbers on the number lines. The first one has been done for you.

a

b

c

Comments, next steps, misconceptions

2 Algebra

2.1 Sequences of numbers

I can

- recognise patterns in sequences of numbers

Example

Here is a sequence of numbers: **9** **13** **17** **21** **25**

Work out the next two numbers.

Solution

The numbers increase by 4 each time.

The next number is 25 + 4 = 29.

The number after 29 is 29 + 4 = 33.

Practice questions

1 Write the next two numbers in each of these number sequences using the rule shown.

a The rule is add on 2 each time.

22 24 26 28 _____ _____

b The rule is add on 5 each time.

7 12 17 22 _____ _____

c The rule is subtract 3 each time.

30 27 24 21 _____ _____

d The rule is subtract 10 each time.

95 85 75 65 _____ _____

e The rule is double each time.

1 2 4 8 _____ _____

2 Write the next two numbers in each of these number sequences.

a 3 5 7 9 _____ _____

b 42 44 46 48 _____ _____

c 30 35 40 45 _____ _____

d 1 7 13 19 _____ _____

e 40 37 34 31 _____ _____

f 50 44 38 32 _____ _____

g 10 21 32 43 _____ _____

h 120 116 112 108 _____ _____

3 Write in the missing numbers in each of these number sequences.

a 12 16 _____ 24 28 32 _____ 40

b 17 22 27 _____ _____ 42 47 52 _____ 62

c 99 96 93 _____ 87 _____ 81 78 _____ 72 69

d 46 42 _____ _____ _____ 26 22 18 _____

2.2 The equals sign

I can

- use the equals sign (=) correctly

Example

Here are some numbers with gaps between them: **9 _____ 3 _____ 4 _____ 2**

Put the signs +, – and = in the gaps to make a correct statement.

Solution

Try putting the signs in different places.

The correct way is: $9 - 3 = 4 + 2$.

$9 - 3$ and $4 + 2$ are both equal to 6.

Practice questions

1 Put the signs + and = in each of these to make a correct statement.

a 9 _____ 3 _____ 6 **b** 12 _____ 2 _____ 14

c 6 _____ 1 _____ 7 **d** 11 _____ 3 _____ 8

2 Put the signs – and = in each of these to make a correct statement.

a 9 _____ 3 _____ 6 **b** 12 _____ 14 _____ 2

c 6 _____ 7 _____ 1 **d** 11 _____ 3 _____ 8

3 Put the signs +, – and = in each of these to make a correct statement.

a 12 ____ 3 ____ 18 ____ 3 **b** 3 ____ 8 ____ 5 ____ 6 **c** 10 ____ 6 ____ 8 ____ 4

4 Put the signs +, × and = in each of these to make a correct statement.

a 3 ____ 5 ____ 2 ____ 4 **b** 3 ____ 5 ____ 8 ____ 7 **c** 6 ____ 3 ____ 3 ____ 3

5 Put signs in each of these to make correct statements.

a 24 = 4 _____ 6

b 24 _____ 4 = 6

c 19 = 12 _____ 7

d 19 _____ 12 = 7

6 Put signs in each of these to make correct statements.

a 12 = 3 _____ 4 _____ 5

b 4 _____ 3 = 2 _____ 6

c 5 _____ 4 = 8 _____ 7

d 2 _____ 5 = 6 _____ 4

e 5 _____ 1 = 12 _____ 2

f 50 _____ 8 = 25 _____ 17

Comments, next steps, misconceptions