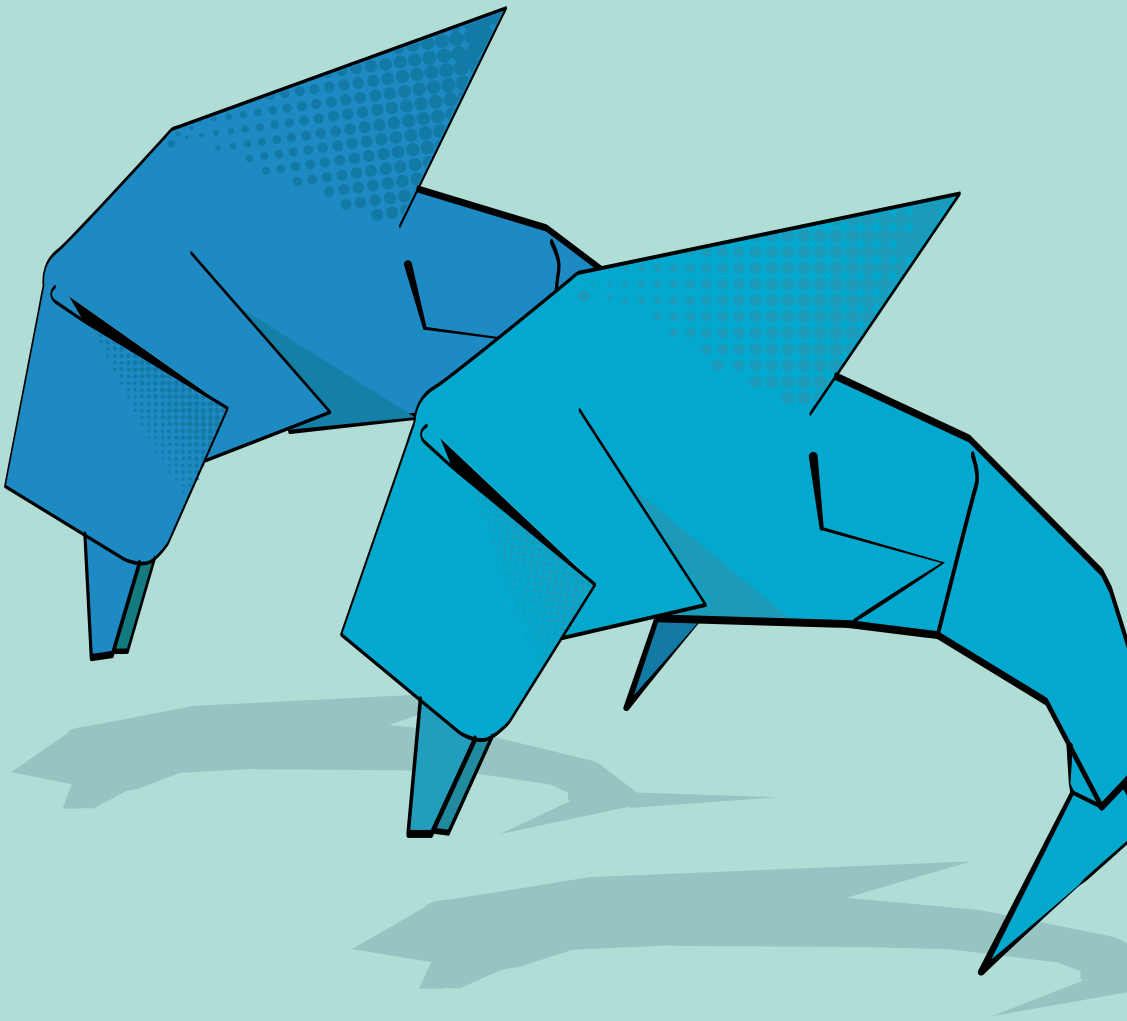
Pearson
Revise

Pearson Edexcel GCSE (9–1)

Mathematics

Foundation tier

Revision Workbook



REVISE PEARSON EDEXCEL GCSE (9–1)
Mathematics
Foundation

REVISION WORKBOOK

Series Consultant: Harry Smith

Author: Navtej Marwaha

Get the inside track

Look out for these features to help turbo-charge your revision:

Examiners' report These questions cover skills and techniques that real students have struggled with in recent exams. Check out the corresponding *Revision Guide* page for more top tips and things to watch out for.

Problem solved! You will have to use problem-solving skills throughout your exam. Boxes with this icon will highlight problem-solving skills and strategies to help you stay ahead of the pack.

Hot Topic We've picked 25 of the hottest topics. These pages contain key skills and knowledge that you're likely to need in your upcoming exams. If you're pushed for time you might want to practise these first.

Tricky Topic There is some tough material in GCSE Maths. We've identified 25 of the trickiest topics. You might want to save these topics for days when you have a bit more time to concentrate on them.

Guided Where you see this icon, part of the answer has been completed for you.

Target grade 4 This scale tells you how difficult each question is.

A small bit of small print

Pearson Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions have been written to help you practise every topic in the book. Remember: the real exam questions may not look like this.

Pearson

Contents

1-to-1 page match with the Revision Guide
ISBN 9781447988045

KEY

= Hot Topic = Tricky Topic

Place value

Target grade 1

1 (a) Write the number nine thousand, three hundred and fifty-one in figures.

Guided

9 .... **(1 mark)**

(b) Write the number 4196 in words.

Four thousand, one hundred and ..... **(1 mark)**

(c) Write down the value of the 5 in the number 95 872.

5 ..... **(1 mark)**

Target grade 1

2 Write down the number twelve thousand and sixty in a place value table.

Guided

.....	.....	Hundreds	.....	Units
.....	.....	.....	6	0

(2 marks)

Target grade 1

3 Write these numbers in order:

(a) 165, 146, 127, 49, 169

Start with the lowest number.

..... **(1 mark)**

(b) 7429, 7249, 7942, 7924, 7028

..... **(1 mark)**

Target grade 1

4 Write these amounts in order:

(a) £63 452, £63 593, £65 601, £63 004, £62 400

..... **(1 mark)**

(b) £1.20, 63p, £1.02, 36p, £1.12

Convert the pounds into pence and then put the numbers in order.

..... **(1 mark)**

Target grade 1

5 Peter wrote down his weekly pocket money in order.
£1.80, £1.95, £2.10, £2.01, £2.45, £2.50
Is he correct?

..... **(1 mark)**

Target grade 1

6 Anton is buying supplies for a charity event.
A pack of 50 paper cups costs £1.89.
A pack of 10 paper plates costs 49p.
Anton has £15 to spend.
Anton buys 250 paper cups and spends the rest on paper plates.
How many paper plates can he buy?

Examiners' report Read questions carefully and copy any figures from the question accurately. Your final answer should be the number of paper plates Anton can buy, not an amount of money.

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Negative numbers

Target grade 1

1 (a) Write the following numbers in order:

Guided

6 ~~−11~~ −4 0 4

Start with the lowest number.

−11 …….. …….. …….. …….. **(1 mark)**

(b) Work out

− − = +

(i) −9 + 7 = …….. **(1 mark)** (ii) −7 − −4 = …….. = …….. **(1 mark)**

(iii) −6 − 4 = …….. **(1 mark)** (iv) −10 − +6 = …….. **(1 mark)**

Target grade 1

2 (a) Work out

+ × + = + + × − = − − × + = − − × − = +

Guided

(i) −7 × 2 = −14 **(1 mark)** (ii) 63 ÷ −9 = …….. **(1 mark)**

(iii) −6 × −4 = …….. **(1 mark)** (iv) −42 ÷ −6 = …….. **(1 mark)**

+ ÷ + = + + ÷ − = − − ÷ + = − − ÷ − = +

Target grade 1

3 On a certain day in Moscow the temperature at 12 noon is 7 °C but by 6 pm it has dropped by 9 °C. By 9 pm it has dropped a further 5 °C and by 12 midnight it has dropped a further 8 °C. Find the temperature at

(a) 6 pm ……°C **(1 mark)** (b) 9 pm ……°C **(1 mark)** (c) 12 midnight ……°C. **(1 mark)**

Guided

(d) What was the overall drop in temperature from 12 noon to 12 midnight?

Temperature at 12 noon = 7 °C

Temperature at 12 midnight = ……

Drop in temperature = 7 − …….. = ……°C **(1 mark)**

Target grade 1

4 The table gives information about the highest and lowest temperatures in five cities during one year.

	London	New York	Moscow	New Delhi	Lisbon
Highest temperature (°C)	30	28	25	40	29
Lowest temperature (°C)	−8	−10	−15	−7	−3

(a) What is the difference between the highest temperature in New Delhi and the lowest temperature in New York?

Write down 'highest temperature of New Delhi – lowest temperature of New York'. Remember to include units in your answer.

……°C **(1 mark)**

(b) Which city recorded the biggest difference between the highest and lowest temperature?

…… **(1 mark)**

Viktor works out that the temperature halfway between the lowest temperature in Lisbon and the lowest temperature in Moscow is –10 °C.

(c) Is Viktor correct? Give a reason for your answer.

…… **(1 mark)**

Rounding numbers

Target grade 1

1 Round

Guided

(a) 26 723 to the nearest thousand

27 000 **(1 mark)**

(b) 6453 to the nearest hundred

6..... **(1 mark)**

(c) 87 536 to the nearest ten.

87 5..... **(1 mark)**

Target grade 3

2 Round 8.635 21 correct to

(a) 1 significant figure

..... **(1 mark)**

(b) 2 significant figures

..... **(1 mark)**

(c) 3 significant figures.

..... **(1 mark)**

Target grade 3

3 Round 0.003 467 2 correct to

Guided

(a) 1 significant figure

0.003 **(1 mark)**

(b) 2 significant figures

..... **(1 mark)**

(c) 3 significant figures.

..... **(1 mark)**

The first significant figure is the number 3.

Target grade 3

4 Round 38 652 correct to

Guided

(a) 1 significant figure

40 000 **(1 mark)**

(b) 2 significant figures

..... **(1 mark)**

(c) 3 significant figures.

..... **(1 mark)**

You need to include enough zeros to show the correct place value.

Target grade 3

5 In her science class, Anjali measured the mass of some objects made from different types of materials. Here are her results.

Material	Wood	Plastic	Metal	Rubber
Mass *m* (g)	20.356	265.800	168.240	127.500

Write down the mass of the

(a) wood to 3 significant figures

..... **(1 mark)**

(b) plastic to the nearest hundred grams

..... **(1 mark)**

(c) metal to 2 significant figures

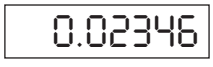
..... **(1 mark)**

(d) rubber to the nearest ten grams.

..... **(1 mark)**

Target grade 3

6 Jason is weighing some objects on an electronic scale.



He writes the answer as 0.023 g correct to 3 significant figures.
Is he correct? Explain your answer.

Problem solved! State whether Jason is correct **and** write some words explaining why. You could write the correct answer, or explain what Jason has done wrong.

Which number is the first significant figure?

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Adding and subtracting

Target grade 1

1 Work out

(a) 842 + 158 + 23

Guided

842
158
+ 23
.....3

(1 mark)

(b) 741 − 164

6 7 13 1
7 4 1
− 1 6 4
.....7

(1 mark)

Target grade 1

2 Work out

(a) 7263 + 915

..... **(1 mark)**

(b) 7629 − 7452

..... **(1 mark)**

Target grade 1

3 Kevin buys some items from a shop.
He buys a box of chocolates costing £3.65 and three rolls of wrapping paper costing £1.65 each.
He gives the cashier a £20 note.
How much change should he receive?

Guided

Convert the pounds into pence.

365 + 165 + 165 + 165 = ...

2000 − ..... = ...

(3 marks)

Target grade 1

4 There are 52 children on the pirate ship at a fairground.
When the pirate ship stops, 39 children get off and 28 children get on.
How many children are now on the pirate ship?

In this case 'get off' means subtract and 'get on' means add.

You have to show your working. Do not just write down a number.

..... **(2 marks)**

Target grade 1

5 Part of a receipt is missing.
David pays £5 and receives 50p change.
David works out that the coffee cost £2.49.

Slice of cake	95p
Mug of tea	£1.49
Cup of coffee	

Problem solved! The easiest way to work out whether David is correct is to calculate the cost of a cup of coffee. Remember to show your working and write a conclusion to answer the question.

Is he correct? Explain your answer.

.....

..... **(3 marks)**

Multiplying and dividing

Target grade 1

1 Work out

Guided

(a) 83×23

Work out 83×3

Work out 83×2

$$\begin{array}{r} 83 \\ \times\ 23 \\ \hline \ldots\ldots\ldots \\ \ldots\ldots\ldots0 \\ \hline \ldots\ldots\ldots \end{array}$$

(1 mark)

(b) $972 \div 4$

$$4\overline{)9^{1}72}\quad \ldots\ldots\ldots$$

$4 \times 2 = 8$ so 4 divides into 9 twice with remainder 1.

(2 marks)

Target grade 1

2 Tins of biscuits come in three sizes. There are 28 biscuits in the small size and four times as many in the medium size. In the large size there are seven times as many as in the small size. How many biscuits are in the

(a) medium size

..... **(1 mark)**

(b) large size?

..... **(1 mark)**

Target grade 1

3 A shop sold 42 boxes of flowers. Each box contained 18 flowers. Work out the total number of flowers sold.

Examiners' report Show all of your working, writing figures neatly so they can be easily read.

..... **(3 marks)**

Target grade 1

4 Work out

Guided

(a) 962×45

Work out 962×5

Work out 962×4

$$\begin{array}{r} 962 \\ \times\ 45 \\ \hline \ldots\ldots\ldots \\ \ldots\ldots\ldots0 \\ \hline \ldots\ldots\ldots \end{array}$$

(2 marks)

(b) $442 \div 13$

$$13\overline{)442}\quad 3\ldots$$

(2 marks)

Target grade 1

5 Dylan packs tomato tins into boxes. Each box holds 36 tomato tins. How many boxes will he need to pack

(a) 180 tins

..... **(1 mark)**

(b) 324 tins?

..... **(1 mark)**

Target grade 1

6 Sam bought five boxes of chocolates. Each box contained 25 chocolates. Sam ate 30 chocolates himself. He then shared the remaining chocolates between himself and his four friends.

(a) How many chocolates did Sam buy?

..... **(1 mark)**

(b) How many chocolates did each of Sam's friends receive?

..... **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Decimals and place value

Target grade 1

1 (a) Write down the value of the 7 in 9.74

..... **(1 mark)**

Remember the first number after the decimal point is a tenth and then a hundredth and so on.

(b) Write down the value of the 8 in 0.684

..... **(1 mark)**

(c) Write down the value of the 4 in 0.704

..... **(1 mark)**

Target grade 1

2 Write the following numbers in order, smallest first:

3.2 6.4 6.2 12.8 1.4

..... **(1 mark)**

Target grade 1

Guided

3 Write the following numbers in order, smallest first:

0.61 0.611 0.613 0.6 0.05

0.610 0.611 0.613 0.600 ~~0.050~~

0.050 .... **(1 mark)**

Place zeros on these numbers so they all have the same number of decimal places.

Target grade 1

4 Write the following numbers in order, smallest first:

0.73 0.7 0.725 0.778 0.78

..... **(1 mark)**

Target grade 2

Guided

5 Using the information that $5.7 \times 43 = 245.1$ write down the value of

(a) $57 \times 43 =$

245.1 × ..... = ... **(1 mark)**

5.7 has been multiplied by 10 and 43 is unchanged. 245.1 needs to be multiplied by 10.

(b) $5.7 \times 4.3 =$

245.1 ÷ ..... = ... **(1 mark)**

5.7 is unchanged and 43 has been divided by 10. 245.1 needs to be divided by 10.

(c) $245.1 \div 57 =$

43 ÷ ..... = ... **(1 mark)**

245.1 is unchanged and 5.7 has been multiplied by 10. 43 needs to be divided by 10.

Target grade 2

6 Sammy writes down the following in his exercise book

435.2 ÷ 13.6 = 320

He uses the information to say that
$32 \times 136 = 4352$
Is he correct? Explain your answer.

Write 'yes' or 'no' and give your reason. You can use working to explain your answer if it is easier than writing it as a sentence.

..... **(1 mark)**

Operations on decimals

Target grade 2

Guided

1 Work out

(a) 4.23 + 10.4

4.23
+ 10.40
.....3

Make sure all the decimal points are lined up and then write zeros in the spaces so that all the numbers have the same number of decimal places.

(2 marks)

(b) 84.7 − 9.34

84.70
− 9.34
.....

(2 marks)

(c) 7.32 × 16

First work out 732 × 16. In total there are 2 decimal places in the calculation, so put 2 decimal places in your answer.

..... **(2 marks)**

(d) 0.47 × 0.07

..... **(2 marks)**

(e) 83.4 ÷ 6

6)83.4

..... **(2 marks)**

(f) 81.9 ÷ 1.3

..... **(2 marks)**

Target grade 1

2 A coach ticket to the zoo costs £7.85. A teacher buys 36 of these tickets for his class.
What is the total cost of the 36 tickets?

785
× 36
____

Total cost = £.....

In total there are 2 decimal places in the calculation, so put 2 decimal places in your answer. Remember to write in the units.

(2 marks)

Target grade 2

3 Charles repairs computers.
He charged a customer £123.20 to repair a computer.
It took him 8 hours to repair the computer.
How much did he charge for one hour?

£..... **(2 marks)**

Target grade 2

4 Kitty buys hot chocolate sachets.
There are 14 hot chocolate sachets in a small box.
A small box costs £3.49.
Kitty uses 3 hot chocolate sachets each day.
Work out the how much Kitty spends on hot chocolate sachets in a four-week period.

Problem solved! For a longer question like this, it's a good idea to plan your strategy. Calculate

1. number of days in a four-week period
2. number of sachets used in a four-week period
3. number of small boxes used in a four-week period
4. total cost of those boxes.

£..... **(4 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Squares, cubes and roots

Target grade 1

1 Work out

(a) 4^2 ..... **(1 mark)**

(b) 2^3 ..... **(1 mark)**

(c) $\sqrt{81}$ ..... **(1 mark)**

(d) $\sqrt{64}$ ..... **(1 mark)**

(e) $\sqrt[3]{64}$ ..... **(1 mark)**

(f) $\sqrt[3]{8}$ ..... **(1 mark)**

(g) $\sqrt[3]{27}$ ..... **(1 mark)**

(h) $\sqrt[3]{-64}$ ..... **(1 mark)**

(i) $\sqrt[3]{-125}$ ..... **(1 mark)**

Target grade 1

2 Write down

(a) the square of 9 ..... **(1 mark)**

(b) the cube of 5 ..... **(1 mark)**

(c) the square root of 144 ..... **(1 mark)**

(d) the cube root of 216 ..... **(1 mark)**

Target grade 2

3 Work out the value of $5^2 + 3^3$

Square the 5 and cube the 3 before you add.

Guided

$(5 \times 5) + (3 \times 3 \times 3) =$ ..... + ... = ... **(1 mark)**

Target grade 2

4 2, 8, 11, 15, 21, 26, 36, 49

Write down a number from the list that

(a) is a square number ..... **(1 mark)**

(b) is a cube number ..... **(1 mark)**

(c) has a square root of 7. ..... **(1 mark)**

Target grade 2

5 Tom carried out an investigation and concluded that

'6 is a cube number since $2^3 = 6$'

Is he correct?

You can explain your answer by writing a sentence with your reason, or by showing some neat working.

Guided

No, because $2 \times 2 \times 2 =$ ..... **(1 mark)**

Target grade 3

6 If you add three square numbers then you always get an even number.

Is this statement correct? Explain your answer.

Problem solved! Try to find an example of three square numbers that add up to an **odd** number to show the statement is incorrect.

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Indices

Target grade 3

1 Write as a single power of 4

Guided

(a) $4 \times 4 = 4^{\cdots}$ **(1 mark)** (b) $4 \times 4 \times 4 \times 4 \times 4 =$ ..... **(1 mark)**

Target grade 4

2 Simplify and leave your answers in index form.

Guided

(a) $5^3 \times 5^6$ Add the powers.

$5^3 \times 5^6 = 5^{3+6} = 5^{\cdots}$ **(1 mark)**

(b) $5^9 \div 5^6$ Subtract the powers.

$5^9 \div 5^6 = 5^{9-6} = 5^{\cdots}$ **(1 mark)**

(c) $\dfrac{5^{12}}{5 \times 5^7}$ First work out the power of 5 in the denominator.

..... **(2 marks)**

(d) $(5^3)^4$ Multiply the powers.

..... **(1 mark)**

Target grade 5

3 Write as a single power of 9

Guided

(a) $\dfrac{1}{9} = 9^{-\cdots}$ **(1 mark)** (b) $\dfrac{1}{9 \times 9 \times 9 \times 9} =$ ..... **(1 mark)**

Target grade 5

4 Simplify and leave your answers in index form.

(a) $\dfrac{3^2 \times 3^6}{3^5}$ ..... **(2 marks)**

(b) $\dfrac{3^{12}}{3^6 \times 3^4}$ ..... **(2 marks)**

(c) $\dfrac{3^7 \times 3^6}{3 \times 3^4}$ ..... **(2 marks)**

(d) $\dfrac{3^8 \times 3^{-6}}{3 \times 3^{-5}}$ ..... **(2 marks)**

Target grade 5

5 Complete the following:

Anything to the power zero equals ONE.

(a) $7^0 =$ ..... **(1 mark)**

(b) $7^{-1} = \dfrac{1}{\cdots\cdots}$ **(1 mark)**

(c) $7^{-2} = \dfrac{1}{7^2} = \dfrac{1}{\cdots\cdots}$ **(1 mark)**

(d) $4^{-3} =$ ..... **(1 mark)**

(e) $\left(\dfrac{3}{4}\right)^3 = \dfrac{3^3}{4^3} = \dfrac{\cdots\cdots}{\cdots\cdots}$ **(1 mark)**

(f) $\left(\dfrac{4}{5}\right)^{-2} = \left(\dfrac{5}{4}\right)^2 = \dfrac{\cdots\cdots}{\cdots\cdots}$ **(1 mark)**

Turn the fraction upside down, then change the negative power to a positive power.

Target grade 5

6 $7^4 \times 7^x = \dfrac{7^9 \times 7^6}{7^3}$

Find the value of x.

$x =$ ..... **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Estimation

Target grade 4

1 Work out an estimate for the value of

Round both values to 1 significant figure.

Guided

(a) $188 \times 69 \approx 200 \times 70 =$ ..... **(1 mark)**

(b) $28.9 \div 4.85 \approx$ ..... $\div$ ..... = ... **(1 mark)**

(c) $(51.2)^3 \approx$ (.....)^3 = ... **(1 mark)**

Target grade 4

2 Work out an estimate for the value of $\dfrac{4826}{4.1 \times 9.72}$

1. Round all values to 1 significant figure.
2. Multiply the numbers in the denominator.
3. Cancel if possible, then divide.

Guided

$\approx \dfrac{5000}{4 \times .....} = \dfrac{.....}{.....} =$ ..... **(2 marks)**

Target grade 4

3 Work out an estimate for the value of $\dfrac{8.92 \times 408}{0.506}$

..... **(2 marks)**

Target grade 4

4 Work out an estimate for the value of $\dfrac{716 \times 5.13}{0.191}$

If you need to divide by a decimal you can multiply top and bottom by 10 or 100 to simplify the calculation.

$\dfrac{700 \times 5}{0.2} = \dfrac{3500}{0.2} = \dfrac{.....}{2} =$ ..... **(2 marks)**

Target grade 4

5 Work out an estimate for the value of $\dfrac{29 \times 4.90}{0.204}$

..... **(2 marks)**

Target grade 4

6 Work out an estimate for the value of $\dfrac{5.89 \times 291}{0.051}$

..... **(2 marks)**

Target grade 5

7 The radius of a sphere is 6.2 cm.

Surface area of a sphere = $4\pi r^2$

Examiners' report: If you are multiplying (or squaring) a number, then rounding down will produce an underestimate, and rounding up will produce an overestimate.

(a) Work out an estimate for the surface area of the sphere.

Round π and r to 1 significant figure.

.....cm^2 **(2 marks)**

(b) Without further calculation, explain whether your method gives you an overestimate or an underestimate for the surface area of the sphere.

..... **(1 mark)**

Factors, multiples and primes

Target grade 1

1 (a) Write down all the factors of 36.

Guided

1 × 36, 2 × ……., ……. × ……., ……. × ……., ……. × ……. **(2 marks)**

(b) Write down the first ten multiples of 7.

7 14 ……. ……. ……. ……. ……. ……. ……. ……. **(1 mark)**

Target grade 1

2 Use a word from the box to complete these sentences correctly.

multiple	factor
square root	cube

(a) 12 is a ……. of 132. **(1 mark)**

(b) 132 is a ……. of 12. **(1 mark)**

Target grade 1

3 The table shows some numbers.

41	42	43	44	45	46	47	48	49

Three of the numbers are prime numbers.
Put a tick (✓) underneath each of these three numbers. **(1 mark)**

Target grade 1

4 From this list of numbers write down

2 8 6 12 21 25 33 49

(a) a factor of 30 ……. **(1 mark)** (b) a multiple of 7 ……. **(1 mark)**

(c) two factors of 24 that have a product of 48 …….. **(2 marks)**

Target grade 1

5 Write down three factors of 28 which have a sum between 20 and 25.

Start by listing the factors of 28.

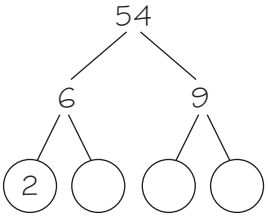
…….. **(2 marks)**

Target grade 4

6 Express the following numbers as products of their prime factors.
Give your answers in index form.

Guided

(a) 54



54 = 2 × ……. × ……. × ……. = 2 × …….

The prime factors are always circled.

(3 marks)

(b) 96 (c) 126 (d) 252

……. **(3 marks)** ……. **(3 marks)** ……. **(3 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

HCF and LCM

Target grade 4

1 (a) Find the highest common factor (HCF) of 72 and 84.

Guided

1. List the factors of 72.
2. List the factors of 84.
3. Circle all the common factors.
4. Choose the highest common factor.

1 × 72, 2 × ……., ……. × ……., ……. × ……., ……. × ……., ……. × …….

1 × 84, 2 × ……., ……. × ……., ……. × ……., ……. × ……., ……. × …….

…… **(3 marks)**

(b) Find the lowest common multiple (LCM) of 12 and 15.

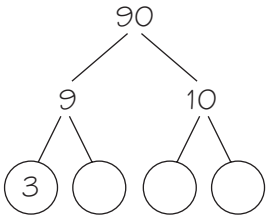
…… **(2 marks)**

Target grade 4

2 (a) Write the following numbers as products of their prime factors.

Guided

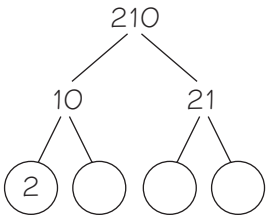
(i) 90



Examiners' report: You need to include multiplication signs in your answer.

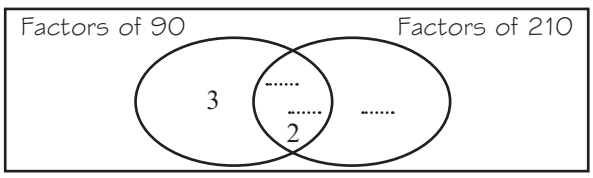
90 = 3 × …… × …… × …… **(2 marks)**

(ii) 210



210 = 2 × …… **(2 marks)**

(b) Find the highest common factor (HCF) of 90 and 210.



Draw a Venn diagram showing the prime factors of each number. Multiply the prime factors in the **intersection** of the Venn diagram.

HCF = 2 × …… × …… = …… **(1 mark)**

(c) Find the lowest common multiple (LCM) of 90 and 210.

Multiply **all** the prime factors in the Venn diagram.

LCM = 3 × …… × …… × …… × …… = …… **(1 mark)**

Target grade 4

3 (a) Find the highest common factor (HCF) of 36 and 48.

…… **(1 mark)**

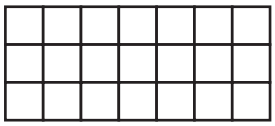
(b) Find the lowest common multiple (LCM) of 36 and 48.

…… **(1 mark)**

Fractions

Target grade 1

1 Shade $\frac{3}{7}$ of this shape.



(1 mark)

Examiners' report Learn your times tables up to 12 × 12. It makes fraction questions much easier!

Target grade 1

2 Write the following fractions in their simplest form.

Guided

(a) $\frac{30}{60} = \frac{\ldots\ldots\ldots\ldots}{\ldots\ldots\ldots\ldots}$ **(1 mark)**

(b) $\frac{12}{18} = \frac{\ldots\ldots\ldots\ldots}{\ldots\ldots\ldots\ldots}$ **(1 mark)**

(c) $\frac{35}{120} \overset{\div 5}{\underset{\div 5}{}} = \frac{\quad}{\quad}$

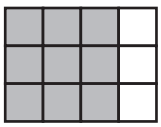
What number will go into 35 and 120?

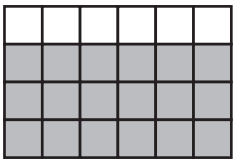
(1 mark)

(d) $\frac{24}{84} = \frac{\ldots\ldots\ldots\ldots}{\ldots\ldots\ldots\ldots}$ **(1 mark)**

Target grade 1

3 Write down the fraction of these shapes that are shaded.
Write your fraction in its simplest form.

(a)  ..... **(2 marks)**

(b)  ..... **(2 marks)**

Target grade 1

4 Work out

Guided

(a) $\frac{3}{4}$ of £60

£60 ÷ 4 = ...

..... × 3 = £..... **(2 marks)**

(b) $\frac{4}{5}$ of £80

£..... **(2 marks)**

(c) $\frac{7}{8}$ of £160

£..... **(2 marks)**

(d) $\frac{5}{7}$ of £210

£..... **(2 marks)**

Target grade 2

5 Sandeep bought 30 punnets of strawberries for £20.
$\frac{1}{6}$ of the punnets were rotten so he threw them away.
He sold the remaining punnets for £1.50 each.
Work out Sandeep's profit.

Problem solved! **Profit** means the total amount of money Sandeep made, minus the £20 that he spent.

£..... **(4 marks)**

Target grade 2

6 Tom bought 20 boxes of flowers. Each box cost him £6.
Each box contains 15 flowers.
He sells $\frac{3}{5}$ of the total number of flowers for 70p each.
He then sells the remaining at 50p each.
Work out the total profit Tom makes.

£..... **(5 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Operations on fractions

Target grade 2

1 Work out

Write both fractions as equivalent fractions with the same denominator.

Guided

(a) $\frac{1}{3} + \frac{2}{5}$

$= \frac{5}{15} + \frac{\cdots\cdots}{15} = \frac{\cdots\cdots}{15}$ **(2 marks)**

(b) $\frac{4}{5} - \frac{1}{4}$

$= \frac{\cdots\cdots}{20} - \frac{\cdots\cdots}{20} = \frac{\cdots\cdots}{20}$ **(2 marks)**

(c) $\frac{6}{7} + \frac{3}{8}$

..... **(2 marks)**

(d) $\frac{5}{9} - \frac{4}{7}$

..... **(2 marks)**

Target grade 2

2 Work out

(a) $\frac{1}{2} \times \frac{1}{3}$

..... **(1 mark)**

(b) $\frac{5}{11} \times \frac{3}{4}$

..... **(1 mark)**

(c) $\frac{4}{5} \div \frac{3}{10}$

Turn the second fraction upside down and change ÷ into ×

..... **(2 marks)**

(d) $\frac{2}{3} \div \frac{4}{9}$

..... **(2 marks)**

Target grade 2

3 A man wins some money and decides to give it to his three children.

Andrew receives $\frac{2}{5}$ of the money, Ben receives $\frac{1}{3}$ of the money and Carla receives the rest.

Work out the fraction that Carla receives.

Guided

Write 1 as a fraction with the same numerator and denominator. $1 = \frac{15}{15}$

$\frac{2}{5} + \frac{1}{3} = \frac{\cdots\cdots}{15} + \frac{\cdots\cdots}{15} = \frac{\cdots\cdots}{15}$

$1 - \frac{\cdots\cdots}{15} = \frac{\cdots\cdots}{15} =$ **(3 marks)**

Target grade 2

4 A garage has a supply of 210 litres of oil.

Amy uses $\frac{4}{7}$ of the supply and Brad uses $\frac{1}{5}$ of the supply.

(a) What fraction of the supply is left?

..... **(3 marks)**

(b) How much oil is left?

..... litres **(2 marks)**

Tricky Topic

Mixed numbers

Target grade 4

1 Work out

Guided

(a) $3\frac{4}{5} + 2\frac{3}{4}$

You need to write mixed numbers as improper fractions before you do any calculations.

$= \frac{19}{5} + \frac{\ldots\ldots}{4} = \frac{\ldots\ldots}{20} + \frac{\ldots\ldots}{20} = \frac{\ldots\ldots}{20} =$ ……..

Write your final answer as a mixed number in its simplest form.

(3 marks)

(b) $4\frac{2}{5} - 2\frac{3}{10}$

$= \frac{\ldots\ldots}{5} - \frac{\ldots\ldots}{10} = \frac{\ldots\ldots}{10} - \frac{\ldots\ldots}{10} = \frac{\ldots\ldots}{10} =$ …….. **(3 marks)**

Target grade 4

2 Work out

Guided

(a) $1\frac{2}{3} \times 2\frac{3}{10}$

$= \frac{\ldots\ldots}{3} \times \frac{\ldots\ldots}{10} = \frac{\ldots\ldots}{\ldots\ldots} =$ …….. **(3 marks)**

(b) $4\frac{2}{3} \div 1\frac{2}{5}$

Don't forget to replace the ÷ with × sign and then flip the fraction over.

$= \frac{\ldots\ldots}{3} \div \frac{\ldots\ldots}{5} = \frac{\ldots\ldots}{3} \times \frac{\ldots\ldots}{\ldots\ldots} = \frac{\ldots\ldots}{\ldots\ldots} =$ …….. **(3 marks)**

Target grade 4

3 Work out

(a) $3\frac{1}{2} \times 2\frac{4}{7}$

…… **(3 marks)**

(b) $5\frac{1}{3} \div 1\frac{4}{9}$

…… **(3 marks)**

Target grade 4

4 It takes $4\frac{2}{3}$ hours to paint a room, and $1\frac{1}{4}$ hours for all the paint to dry.

How long does it take altogether?

Examiners' report You can check your answer makes sense by estimating. $4\frac{2}{3} + 1\frac{1}{4}$ is close to $5 + 1 = 6$

…… hours **(3 marks)**

Target grade 4

5 James has $1\frac{1}{6}$ litres of milk left in the fridge and needs $2\frac{2}{9}$ litres for a recipe.

How much more milk does he need?

…… litres **(3 marks)**

Target grade 4

6 A tape is $14\frac{2}{3}$ m long. How many pieces of tape each of $1\frac{2}{9}$ m can be cut from the length of tape?

…… **(3 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Calculator and number skills

Target grade 1

1 Work out

Guided

(a) $11 + 8 \div 2$

11 + ... = ... **(1 mark)**

(b) $2 + 9 \times 10 + 3$

..... **(1 mark)**

(c) $8 + (3 \times 20) \div 6$

..... **(1 mark)**

(d) $(14 - 5)^2$

..... **(1 mark)**

Target grade 1

2 Work out

You must use BIDMAS.

(a) $\dfrac{27 + 3 \times 3}{3 \times 2}$

..... **(1 mark)**

(b) $\dfrac{13 - 12 \div 4}{4 + 3 \times 2}$

..... **(1 mark)**

(c) $\dfrac{12 + 3 \times 6}{4 + 3 \div 3}$

..... **(1 mark)**

Target grade 2

3 Find the value of $\dfrac{4.5 + 3.75}{3.2^2 - 5.53}$

Guided

Write down all the figures on your calculator display.

8.25 = ...

..... **(2 marks)**

Target grade 2

4 (a) Find the value of $\sqrt{30.25} + 1.75^2$

Enter the numbers into the calculator. You might need to press the S⇔D button to get your answer as a decimal number.

..... **(2 marks)**

(b) Write your answer to part (a) correct to one significant figure.

..... **(1 mark)**

Target grade 2

5 (a) Find the value of $\dfrac{\sqrt{18.3 + 3.6^2}}{2.8 \times 1.6}$

Write down all the figures on your calculator display.

Examiners' report: Work out the numerator and denominator separately, and write them down. Then work out the answer, and write down **all** the figures on your calculator.

..... **(2 marks)**

(b) Write your answer to part (a) correct to 3 significant figures.

..... **(1 mark)**

Target grade 2

6 (a) Find the value of $\dfrac{32.5 \times \sqrt[3]{16.3}}{9.5 \times 3.1}$

Write down all the figures on your calculator display.

..... **(2 marks)**

(b) Write your answer to part (a) correct to 2 significant figures.

..... **(1 mark)**

Standard form 1

Target grade 5

1 (a) Write 45 000 in standard form.

Count decimal places from the right. How many jumps do you need to make to get 4.5?

Guided

45 000 = 4.5 × 10……

(1 mark)

(b) Write 3.4×10^{-5} as an ordinary number.

The power of 10 is negative so the number is less than 1.

3.4×10^{-5} = 0.0……

(1 mark)

(c) Write 28×10^{6} in standard form.

…… **(1 mark)**

Target grade 5

2 Write in standard form

(a) 567 000 …… **(1 mark)**

(b) 0.000 056 7 …… **(1 mark)**

(c) 567×10^{8} …… **(1 mark)**

Target grade 5

3 (a) Write 6 740 000 in standard form.

…… **(1 mark)**

$n = 6\,740\,000$ and $m = 5.42 \times 10^{5}$

Work out, giving your answers in standard form correct to 2 significant figures,

Use the $\times 10^{x}$ button to enter standard form numbers on your calculator.

Guided

(b) $n + m$

6 740 000 + ……

= …… **(2 marks)**

(c) $n - m$

6 740 000 − ……

= …… **(2 marks)**

Target grade 5

4 In 2014 the population of the United Kingdom was 6.5×10^{7}

In 2014 the population of Russia was 1.4×10^{8}

(a) Work out the combined population of the United Kingdom and Russia. Give your answer in standard form.

…… **(2 marks)**

(b) Work out the difference between the population of the United Kingdom and the population of Russia. Give your answer in standard form.

…… **(2 marks)**

Target grade 5

5 In 2011, NASA launched the spacecraft Curiosity to land on the planet Mars. The distance from Earth to Mars is 5.63×10^{8} km. The time it took to reach Mars was 6050 hours.

Guided

Work out the average speed, in km/h, of the spacecraft Curiosity.

Give your answer in standard form correct to 2 significant figures.

$\text{speed} = \frac{\text{distance}}{\text{time}}$ = …… **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Standard form 2

Target grade 5

6 Work out, giving your answers in standard form,

Multiply the number parts then add the powers.

Guided

(a) $(3 \times 10^6) \times (6 \times 10^{-3})$

$= (3 \times \ldots\ldots) \times (10^6 \times 10^{\ldots\ldots}) = \ldots\ldots \times 10^{\ldots\ldots} = \ldots\ldots \times 10^{\ldots\ldots}$ **(2 marks)**

(b) $(8 \times 10^6) \div (4 \times 10^{-14})$

$= (8 \div \ldots\ldots) \times (10^6 \div 10^{\ldots\ldots}) = \ldots\ldots \times 10^{\ldots\ldots}$ **(2 marks)**

Target grade 5

7 Work out, giving your answers in standard form,

Guided

(a) $5.1 \times 10^3 + 6.5 \times 10^4$

$$\begin{array}{r} 5100 \\ +\ 65000 \\ \hline \end{array}$$

..... **(2 marks)**

(b) $7.6 \times 10^5 - 8 \times 10^3$

$$\begin{array}{r} 760000 \\ -\ \ 8000 \\ \hline \end{array}$$

..... **(2 marks)**

Target grade 5

8 A and B are standard form numbers.

$A = 5.6 \times 10^9$ $B = 8 \times 10^{-2}$

Calculate, giving your answers in standard form,

(a) $2A$

..... **(2 marks)**

(b) $A \times B$

..... **(2 marks)**

(c) $A \div B$

..... **(2 marks)**

Target grade 5

9 It takes light 8 minutes to travel from the Sun to the Earth.

The speed of light is 3×10^8 m/s.

Work out the distance, in km, from the Sun to the Earth.

Give your answer in standard form.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

..... **(3 marks)**

Target grade 5

10 The distance from the Sun to the planet Neptune is approximately 4.5×10^9 km.

The speed of light is 3×10^8 m/s.

Work out how long, in seconds, it takes light to travel from the Sun to the planet Neptune.

Problem solved! Convert the distance into metres, then use time $= \frac{\text{distance}}{\text{speed}}$

..... **(3 marks)**

Counting strategies

Target grade 3

1 Ajay writes down one letter from the word ART and then he writes down one number from 1, 2 and 3.

Guided

A	R	T

1	2	3

Do not write down repeats such as (1, A) which is the same as (A, 1).

List all the possible combinations Ajay could write down. One has been done for you.

(A,1) (A, ……..) (A, ……..) (R, ……..) (R, ……..) (R, ……..)
(T, ……..) (T, ……..) (T, ……..) **(2 marks)**

Target grade 3

2 Brett goes to a restaurant.
He can choose from three types of curry
and from three types of naan.
Brett is going to choose one curry and one naan.
List all the possible combinations Brett can choose.

Curry	Naan
Chicken (C)	Plain
Lamb	Garlic
Vegetable	Butter

Label chicken as C, and so on.

…….. **(2 marks)**

Target grade 4

3 Emily has four tiles.
One tile is marked W, one tile is marked X,
one tile is marked Y and one tile is marked Z.
Emily chooses two of these tiles.
Write down all the possible combinations she can get.

W	X	Y	Z

…….. **(2 marks)**

Target grade 4

4 Kate has three cards. Each card has a different digit on it.
Kate wants to make a three-digit number.
Each number is made with all three cards.
How many different numbers can Kate make?

3	6	9

…….. **(2 marks)**

Target grade 4

5 There are four players in a competition,
Asha, Bev, Chloe and Dan.
Each player must play each other once.
How many games will be played in total?

Guided

Problem solved! Label Asha, Bev, Chloe and Dan as A, B, C and D respectively. Remember (A, B) is the same as (B, A).

(A, ……..) (A, ……..) (A, ……..) (B, ……..) …….

…….. **(2 marks)**

Target grade 4

6 A school chess league contains the following five teams:
Hanover, Norman, Stuart, Tudor and Windsor.
Each team must play each other **twice**.
How many games will be played in total?

…….. **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Problem-solving practice 1

Target grade 2

1 Find four different prime numbers you can add together to get a number greater than 30 and less than 40.

..... **(2 marks)**

Target grade 2

2 Crisps cost 35p per packet. A bottle of lemonade costs £1.25. Nigel buys five packets of crisps and one bottle of lemonade. He pays with a £10 note.
Work out how much change he should get.

£..... **(3 marks)**

Target grade 2

3 Here is part of a menu in Harry's café.

Cup of tea	£1.30
Cup of coffee	£1.40

Abbie buys some cups of coffee. She has £15.
Work out the greatest number of cups of coffee she can buy.

..... **(2 marks)**

Target grade 2

4 A shop sells packets of sweets. There are 36 packets of sweets in each box.
In November, the shop sold all the packets of sweets in 120 boxes.
In December, the shop sold all the packets of sweets in 230 boxes.

(a) Work out the total number of packets of sweets the shop sold.

..... **(2 marks)**

(b) Vans deliver the boxes to the shop. A van can carry 72 boxes.
Sandra wants 452 boxes. Sandra works out she needs 6 vans to deliver the boxes.Is she correct? You must show all your working.

..... **(2 marks)**

Target grade 2

5 Which of these fractions is the larger: $\frac{2}{3}$ or $\frac{3}{5}$?
You must show clearly how you got your answer.

(3 marks)

Target grade 3

6 A machine makes 48 bolts every hour. The machine makes bolts for $7\frac{1}{2}$ hours each day, on 5 days of the week. The bolts are packed into boxes. Each box holds 30 bolts. How many boxes are needed for all the bolts made each week?

..... boxes **(4 marks)**