

Written Methods for the Four Operations

Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (2 marks)

Work out

(a) $4\,827 + 3\,596$

Use column addition. Line up the ones, tens, hundreds and thousands.

$$\begin{array}{r} 4\,827 \\ + 3\,596 \\ \hline 8\,423 \end{array}$$

Ones: $7 + 6 = 13$, write 3, carry 1

Tens: $2 + 9 + 1 = 12$, write 2, carry 1

Hundreds: $8 + 5 + 1 = 14$, write 4, carry 1

Thousands: $4 + 3 + 1 = 8$

Answer: 8423

(b) $6\,003 - 2\,478$

Use column subtraction, lining up the columns.

$$\begin{array}{r} 6\,003 \\ - 2\,478 \\ \hline 3\,525 \end{array}$$

Ones: you cannot do $3 - 8$, so exchange.

There are no tens or hundreds, so exchange 1 thousand: 6 003 becomes 5 thousands, 9 hundreds, 9 tens and 13 ones.

Ones: $13 - 8 = 5$

Tens: $9 - 7 = 2$

Hundreds: $9 - 4 = 5$

Thousands: $5 - 2 = 3$

Check: $3525 + 2478 = 6003$ ✓

Answer: 3525

Tip: Always take the bottom digit from the top digit. Do not just take the smaller digit from the bigger one in each column. Check by adding your answer back on.

2 (3 marks)

Work out 347×26

Split 26 into $20 + 6$.

$$347 \times 20 = 6940$$

$$347 \times 6 = 2082$$

Add the two parts: $6940 + 2082 = 9022$

Check with an estimate: $350 \times 25 = 8750$, so about 9000 is sensible.

Answer: 9022

Tip: When you multiply by the 2 in 26, you are really multiplying by 20. Put a 0 in the ones column first (the placeholder zero).

Marks: 2 marks for a complete method (e.g. 6940 and 2082, or a correct grid) with no more than one slip. 1 mark for 9022.

3 (2 marks)

Work out $1512 \div 7$

Use short division (bus stop).

7 into 1 does not go, so look at 15.

$15 \div 7 = 2$ remainder 1. Carry the 1 to the next digit, making 11.

$11 \div 7 = 1$ remainder 4. Carry the 4, making 42.

$42 \div 7 = 6$

Check: $216 \times 7 = 1512$ ✓

Answer: 216

Marks: 1 mark for a correct method, e.g. short division with at most one slip. 1 mark for 216.

4 (2 marks)

Work out

(a) $12.6 + 3.85$

Line up the decimal points. Write 12.6 as 12.60 so both numbers have 2 decimal places.

$$\begin{array}{r} 12.60 \\ + 3.85 \\ \hline 16.45 \end{array}$$

Answer: 16.45

(b) $20 - 7.36$

Write 20 as 20.00 so both numbers have 2 decimal places.

$$\begin{array}{r} 20.00 \\ - 7.36 \\ \hline 12.64 \end{array}$$

Check: $12.64 + 7.36 = 20$ ✓

Answer: 12.64

Tip: Fill the empty decimal places with zeros (20.00) before you subtract, so the columns line up.

5 (2 marks)

Work out $6.34 + 2.8 - 1.57$

Work from left to right.

First add: $6.34 + 2.80 = 9.14$

Then subtract: $9.14 - 1.57 = 7.57$

Answer: 7.57

Tip: Do not add $2.8 + 1.57$ first. The 1.57 is being taken away, so add and subtract in order from left to right.

Marks: 1 mark for 9.14 or a correct method for one step. 1 mark for 7.57.

6 (2 marks)

Work out 0.46×0.18

Ignore the decimal points and multiply the whole numbers:

$$46 \times 18 = 460 + 368 = 828$$

Count the decimal places in the question: 0.46 has 2 and 0.18 has 2.

That is 4 decimal places in total.

So the answer has 4 decimal places: 0.0828

Answer: 0.0828

Tip: Check the size: both numbers are less than 1, so the answer must be smaller than both of them. 8.28 or 0.828 cannot be right.

Marks: 1 mark for 828. 1 mark for 0.0828.

7 (2 marks)

Work out $8.4 \div 0.3$

Make the number you are dividing by a whole number.

Multiply both numbers by 10: $8.4 \div 0.3 = 84 \div 3$

$$84 \div 3 = 28$$

Answer: 28

Tip: Dividing by a number less than 1 gives a bigger answer. So the answer must be bigger than 8.4.

Marks: 1 mark for $84 \div 3$. 1 mark for 28.

8 (1 mark)

Work out 36×0.5

0.5 is one half.

Multiplying by 0.5 is the same as halving.

$$36 \div 2 = 18$$

Answer: 18

9 (3 marks)

Jo packs 500 cakes into boxes.

Each box holds 24 cakes.

How many boxes does she need?

Divide the number of cakes by the number in each box.

$$500 \div 24 = 20 \text{ remainder } 20 \text{ (about 20.8)}$$

20 full boxes hold $20 \times 24 = 480$ cakes.

That leaves 20 cakes, which need one more box.

So she needs $20 + 1 = 21$ boxes.

Answer: 21

Tip: In a real-life problem, think about what the remainder means. Here the leftover cakes still need a box, so round up.

Marks: 1 mark for $500 \div 24$. 1 mark for 20.8... or 20 remainder 20. 1 mark for 21.

10 (1 mark)

Ravi works out $4.2 + 13.75$

$$\begin{array}{r} 4.2 \\ + 13.75 \\ \hline 14.17 \end{array}$$

His answer is wrong.

What mistake has Ravi made?

Ravi lined up the last digits on the right, not the decimal points.

So he added the 2 tenths to the 5 hundredths, and the 4 ones to the 7 tenths.

He really worked out $13.75 + 0.42 = 14.17$

Lining up the decimal points: $4.20 + 13.75 = 17.95$

Answer: He did not line up the decimal points (the correct answer is 17.95)

11 (3 marks)

A craft shop sells buttons.

Single buttons	15p each
Card of 12 buttons	£1.40

Anya needs 36 buttons.

How much does she save by buying cards of buttons instead of single buttons?

Cost of 36 single buttons: $36 \times 15\text{p} = 540\text{p} = \text{£}5.40$

Number of cards needed: $36 \div 12 = 3$

Cost of 3 cards: $3 \times \text{£}1.40 = \text{£}4.20$

Saving: $\pounds 5.40 - \pounds 4.20 = \pounds 1.20$

Answer: $\pounds 1.20$

Tip: Keep your units the same. Change 540p to $\pounds 5.40$ before you subtract $\pounds 4.20$.

Marks: 1 mark for 36×15 or $\pounds 5.40$. 1 mark for 3×1.40 or $\pounds 4.20$. 1 mark for $\pounds 1.20$.

12 (4 marks)

Packets of seeds cost 85p each.

Hana buys some packets of seeds and one watering can.

The watering can costs $\pounds 4.60$

She spends $\pounds 10.55$ altogether.

How many packets of seeds does she buy?

Take the cost of the watering can away from the total.

$$\pounds 10.55 - \pounds 4.60 = \pounds 5.95$$

This is what she spent on seeds.

Work in pence: $595 \div 85$

$$85 \times 7 = 595$$

So she buys 7 packets.

Answer: 7

Tip: Change everything to pence before dividing. $5.95 \div 85$ mixes pounds and pence and gives a silly answer.

Marks: 1 mark for $10.55 - 4.60$. 1 mark for $\pounds 5.95$ (or 595p). 1 mark for $595 \div 85$ or repeated adding of 85p. 1 mark for 7.
