

Related Calculations and Inverse 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 (4 marks)

You are given that $37 \times 64 = 2368$

Use this fact to answer each part. You do not need to do any long multiplication or long division.

(a) Work out 370×640

$$370 = 37 \times 10 \text{ and } 640 = 64 \times 10$$

So the answer is $2368 \times 10 \times 10 = 2368 \times 100$.

$$2368 \times 100 = 236\,800$$

Answer: 236 800

(b) Work out $23.68 \div 0.64$

Multiply both numbers by 100. This does not change the answer.

$$23.68 \div 0.64 = 2368 \div 64$$

From the fact, $2368 \div 64 = 37$

Answer: 37

(c) Work out 3.7×64

3.7 is $37 \div 10$.

So the answer is $2368 \div 10$.

$$2368 \div 10 = 236.8$$

Answer: 236.8

(d) Work out $2368 \div 37$

Division is the inverse (opposite) of multiplication.

$$37 \times 64 = 2368, \text{ so } 2368 \div 37 = 64$$

Answer: 64

Tip: Use the fact you are given. There is no need to do a long division.

2 (1 mark)

$$23 \times 56 = 1288$$

Circle the value of 0.23×5.6

Options: 128.8, 12.88, 1.288, 0.1288

Start from $23 \times 56 = 1288$.

0.23 has 2 decimal places and 5.6 has 1.

So the answer has $2 + 1 = 3$ decimal places.

1.288

Check with an estimate: $0.2 \times 6 = 1.2$ ✓

Answer: 1.288

Tip: Count the decimal places in the question and check with a quick estimate. This stops you putting the decimal point in the wrong place.

3 (2 marks)

Work out the missing number in each calculation.

(a) $- 38 = 67$

The inverse of subtracting 38 is adding 38.

$$67 + 38 = 105$$

$$\text{Check: } 105 - 38 = 67 \quad \checkmark$$

Answer: 105

(b) $8 \times \square = 136$

The inverse of multiplying by 8 is dividing by 8.

$$136 \div 8 = 17$$

$$\text{Check: } 8 \times 17 = 136 \quad \checkmark$$

Answer: 17

4 (2 marks)

Work out the missing number in each calculation.

(a) $4.8 \div \square = 0.48$

0.48 is 4.8 made 10 times smaller.

$$\text{So } 4.8 \div 10 = 0.48$$

Answer: 10

(b) $\square \times 0.3 = 2.4$

The missing number is $2.4 \div 0.3$.

$$\text{Multiply both numbers by 10: } 24 \div 3 = 8$$

$$\text{Check: } 8 \times 0.3 = 2.4 \quad \checkmark$$

Answer: 8

Tip: Multiplying by 0.3 makes a number smaller, so the missing number must be bigger than 2.4. 0.8 is wrong.

5 (1 mark)

Priya works out $912 \div 24 = 38$

Show how Priya can use an inverse operation to check her answer.

The inverse of dividing by 24 is multiplying by 24.

$$38 \times 24 = 912$$

This gives back 912, so her answer is correct.

Answer: $38 \times 24 = 912$

6 (2 marks)

You are given that $64 \times 27 = 1728$

Use this to work out 64×29

64×29 is two more lots of 64 than 64×27 .

Two more lots of 64 is $2 \times 64 = 128$

$$1728 + 128 = 1856$$

Answer: 1856

Tip: 29 is two more than 27, so add **two** lots of 64, not one lot and not 2.

Marks: 1 mark for $1728 + 2 \times 64$ (or $1728 + 128$). 1 mark for 1856.

7 (1 mark)

$$156 \times 27 = 4212$$

Tom says,

$$\text{'So } 15.6 \times 2.7 = 421.2\text{'}$$

Is Tom correct? Tick a box.

Give a reason for your answer.

15.6 has 1 decimal place and 2.7 has 1 decimal place.

So the answer has 2 decimal places: $4212 \div 100 = 42.12$

Check with an estimate: $15 \times 3 = 45$, which is close to 42.12, not 421.2.

Answer: No, it is 42.12

8 (2 marks)

$$64 \times 125 = 8000$$

(a) Work out $8000 \div 12.5$

From the fact: $8000 \div 125 = 64$

12.5 is 10 times smaller than 125.

Dividing by a number 10 times smaller gives an answer 10 times bigger.

$$64 \times 10 = 640$$

Answer: 640

(b) Work out 0.64×1.25

$$0.64 = 64 \div 100 \text{ and } 1.25 = 125 \div 100$$

So the answer is $8000 \div 100 \div 100$.

$$8000 \div 10\,000 = 0.8$$

Answer: 0.8

9 (2 marks)

Rhys has some money.

He spends £15 on a train ticket.

He then shares the rest of his money equally between himself and his 3 sisters.

They each get £12

How much money did Rhys have at the start?

Work backwards using inverse operations, in reverse order.

The money is shared between 4 people (Rhys and his 3 sisters).

Undo the sharing: $4 \times 12 = 48$

Undo the spending: $48 + 15 = 63$

Check: $63 - 15 = 48$, $48 \div 4 = 12$ ✓

Answer: £63

Tip: Count the people carefully: Rhys and his 3 sisters make 4 people, not 3. Then undo the steps in the **opposite order**.

Marks: 1 mark for 4×12 or $48 + 15$. 1 mark for £63.

10 (2 marks)

$$612 \div 18 = 34$$

Use this fact to help you answer both parts.

(a) Circle the value of $612 \div 36$

Options: 1.7, 17, 34, 68

36 is double 18.

Dividing by a number twice as big gives half the answer.

Half of 34 is 17.

Check: $36 \times 17 = 612$ ✓

Answer: 17

Tip: Dividing by a bigger number gives a **smaller** answer, so 68 is wrong.

(b) Work out 34×1.8

Division is the inverse of multiplication, so $34 \times 18 = 612$

1.8 is $18 \div 10$.

So the answer is $612 \div 10 = 61.2$

Answer: 61.2

11 (3 marks)

A coach company charges £12.40 per person for a trip.
36 people go on the trip.

You are given that $124 \times 36 = 4464$

- (a) Work out the total cost for the 36 people.

$$\text{Total cost} = 36 \times 12.40$$

$$12.40 \text{ is } 124 \div 10.$$

$$\text{So the cost is } 4464 \div 10 = 446.40$$

Answer: £446.40

- (b) The coach company charges the same price per person for a different trip.
The total cost of this trip is £892.80
How many people go on this trip?

Look for a link with part (a).

$$446.40 \times 2 = 892.80$$

So the cost is twice as much.

$$\text{That means twice as many people: } 2 \times 36 = 72$$

$$\text{Check: } 72 \times 12.40 = 892.80 \quad \checkmark$$

Answer: 72

Marks: 1 mark for $892.80 \div 12.40$ or seeing that $892.80 = 2 \times 446.40$. 1 mark for 72.
