

Reverse Percentages

Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • 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)

Liam's monthly rent went up by 8%
His rent went up by £56 a month.
What was Liam's monthly rent before it went up?

The £56 is 8% of the old rent.

$$8\% = 56$$

$$1\% = 56 \div 8 = 7$$

$$100\% = 100 \times 7 = 700$$

Answer: £700

Tip: Here £56 **is** 8%. Do not work out 8% of £56.

Marks: 1 mark for a correct method, e.g. $56 \div 8 \times 100$. 1 mark for 700.

2 (3 marks)

A bike shop takes 40% off the price of every bike.
Nadia pays £162 for a bike.
How much did the bike cost before the 40% was taken off?

Nadia pays $100\% - 40\% = 60\%$ of the price before.

So $60\% = 162$ pounds

$$10\% = 162 \div 6 = 27$$

$$100\% = 10 \times 27 = 270$$

(Or with a multiplier: $162 \div 0.6 = 270$)

Answer: £270

Tip: The price before must be **more** than £162. Adding 40% of £162 (giving £226.80) is a common wrong method.

Marks: 1 mark for 60%. 1 mark for $162 \div 0.6$ or equivalent. 1 mark for 270.

3 (2 marks)

This year there are 690 students in a school.
This is 15% more than last year.
How many students were in the school last year?

This year is 115% of last year.

The multiplier is 1.15

$$690 \div 1.15 = 600$$

$$\text{Check: } 600 \times 1.15 = 690 \quad \checkmark$$

Answer: 600

Marks: 1 mark for $690 \div 1.15$. 1 mark for 600.

4 (2 marks)

The average attendance at a football club's home matches fell by 8%
The average attendance is now 23 000
Work out the average attendance before the fall.

After an 8% fall, the attendance is $100\% - 8\% = 92\%$ of what it was.

$$\text{So } 92\% = 23\,000$$

$$23\,000 \div 0.92 = 25\,000$$

Answer: 25 000

Tip: Divide by 0.92. Multiplying by 1.08 (adding 8% back on) does **not** undo an 8% decrease.

Marks: 1 mark for $23\,000 \div 0.92$. 1 mark for 25 000.

5 (3 marks)

Jo's weight decreased by 6%

Her weight is now 70.5 kg.

Work out her weight before the decrease.

After a 6% decrease, her weight is $100\% - 6\% = 94\%$ of what it was.

So $94\% = 70.5\text{ kg}$

$$70.5 \div 0.94 = 75$$

Answer: 75 kg

Marks: 1 mark for 94%. 1 mark for dividing by 0.94. 1 mark for 75.

6 (3 marks)

Toby invests some money in a savings account.

After one year, 3.5% interest is added.

He now has £2587.50 in the account.

How much money did Toby invest?

After 3.5% interest is added, he has $100\% + 3.5\% = 103.5\%$ of what he invested.

The multiplier is 1.035

$$2587.50 \div 1.035 = 2500$$

Answer: £2500

Tip: 3.5% as a decimal is 0.035, so the multiplier is 1.035 (not 1.35).

Marks: 1 mark for 103.5%. 1 mark for dividing by 1.035. 1 mark for 2500.

7 (3 marks)

A shop sells chairs for £67.50 each.

The shop makes a profit of 35% on the price it paid for each chair.

Work out how much the shop paid for each chair.

The profit is 35% of what the shop paid.

So the selling price is $100\% + 35\% = 135\%$ of what it paid.

$$67.50 \div 1.35 = 50$$

Answer: £50

Marks: 1 mark for 135%. 1 mark for $67.50 \div 1.35$. 1 mark for 50.

8 (3 marks)

A plumber sends Mrs Okafor a bill for parts and labour.

VAT at 20% is added to the total cost of the parts and labour.

The bill including VAT is £378

The cost of the labour before VAT was £150

Work out the cost of the parts before VAT was added.

The bill including VAT is $100\% + 20\% = 120\%$ of the bill before VAT.

Bill before VAT: $378 \div 1.2 = 315$ pounds

Labour before VAT was £150

Parts before VAT: $315 - 150 = 165$

Answer: £165

Tip: Remove the VAT from the **whole** bill first, then take away the labour. Taking 20% off £378 (giving £302.40) is a common mistake.

Marks: 1 mark for $378 \div 1.2$. 1 mark for 315. 1 mark for 165.

9 (3 marks)

In a sale, all normal prices are reduced by 20%

Sam buys a coat and a dress in the sale.

The sale price of the coat is £64

The sale price of the dress is £48

How much money did Sam save by buying the coat and the dress in the sale?

Sale prices are $100\% - 20\% = 80\%$ of normal prices.

Normal price of coat: $64 \div 0.8 = 80$ pounds

Normal price of dress: $48 \div 0.8 = 60$ pounds

Normal total: $80 + 60 = 140$ pounds

Sam paid: $64 + 48 = 112$ pounds

Saving: $140 - 112 = 28$

Answer: £28

Marks: 1 mark for dividing by 0.8. 1 mark for 80 and 60 (or 140). 1 mark for 28.
