



- 1 The value of a van is multiplied by 0.88 each year.

Write down the percentage decrease in the value of the van each year.

(1 mark)

A multiplier of 0.88 means the van keeps 88% of its value
 $100\% - 88\% = 12\%$ decrease each year

12%

- 2 Increase £240 by 35%.

Use a single multiplier.

(2 marks)

$$100\% + 35\% = 135\% = 1.35$$

$$= 240 \times 1.35$$

£324

- 3 Last year a rail season ticket cost £640.

This year the same season ticket costs £688.

Work out the percentage increase in the cost of the season ticket.

(3 marks)

$$\text{Increase} = 688 - 640 = £48$$

Compare the increase with the original £640, which represents 100%. Using the new price as the denominator would answer a different question

$$\text{Percentage increase} = 48 \div 640 = 0.075$$

$$0.075 \times 100 = 7.5\%$$

7.5%

- 4 Decrease 650 by 12%.

Use a single multiplier.

(2 marks)

$$100\% - 12\% = 88\% = 0.88$$

$$= 650 \times 0.88$$

572

- 5 Kane buys a bike for £250.
A year later he sells the bike for £210.
Work out his percentage loss.

(3 marks)

$$\text{Loss} = 250 - 210 = £40$$

$$\text{Percentage loss} = 40 \div 250 = 0.16$$

$$0.16 \times 100 = 16\%$$

16%

- 6 A table costs £85 before VAT.
VAT at 20% is added to the price.
Work out the price of the table including VAT.

(2 marks)

$$\text{Add } 20\% \text{ so multiplier} = 1.2$$

$$= 85 \times 1.2$$

£102

- 7 A trader buys a table for £68.
She sells the table for £85.
Work out her percentage profit.

(3 marks)

$$\text{Profit} = 85 - 68 = £17$$

$$\text{Percentage profit} = 17 \div 68 = 0.25$$

$$0.25 \times 100 = 25\%$$

25%

- 8 A sofa costs £840.
In a sale the price is reduced by 18%.
Work out the sale price of the sofa.

(2 marks)

$$\text{Reduce by } 18\% \text{ so multiplier} = 0.82$$

$$= 840 \times 0.82$$

£688.80

- 9 In 2019 Femi bought a flat for £180 000.
In 2026 he sold the flat for £207 000.
Work out his percentage profit.

(3 marks)

$$\text{Profit} = 207000 - 180000 = £27000$$

$$\text{Percentage profit} = 27000 \div 180000 = 0.15$$

$$0.15 \times 100 = 15\%$$

15%

- 10 Sam has £5000 in an account. The value falls by 6%.
Tia has £4800 in an account. The value rises by 4%.
Who has more money now, and by how much?

(3 marks)

Sam: fall 6%, multiplier 0.94

$$5000 \times 0.94 = 4700$$

Tia: rise 4%, multiplier 1.04

$$4800 \times 1.04 = 4992$$

$$= 4992 - 4700$$

Tia has £292 more

- 11 A shop buys phone cases for £3.20 each.
The shop sells each phone case for £4.40.
Show that the shop's percentage profit on each phone case is 37.5%.

(3 marks)

$$\text{Profit on each case} = 4.40 - 3.20 = £1.20$$

$$\text{Percentage profit} = 1.20 \div 3.20 = 0.375$$

$$0.375 \times 100 = 37.5\%, \text{ as required}$$

- 12 Mia bought a flat for £180 000.
In the first year its value increased by 4%. In the second year its value increased by 2.5%.
Work out the value of the flat after two years.

(3 marks)

Year 1: $\times 1.04$

Year 2: $\times 1.025$

$$180\,000 \times 1.04 = 187\,200$$

$$= 187\,200 \times 1.025$$

£191 880

13

Gina buys 40 plants for £1.80 each.
 She sells 32 of the plants for £3 each.
 She sells the rest of the plants for £1.50 each.
 Work out Gina's percentage profit.

(4 marks)

$$\text{Total cost} = 40 \times £1.80 = £72$$

Sales

$$32 \times £3 = £96, \text{ and the remaining 8 plants: } 8 \times £1.50 = £12$$

$$\text{Total sales} = 96 + 12 = £108$$

$$\text{Profit} = 108 - 72 = £36$$

$$\text{Percentage profit} = 36 \div 72 = 0.5 = 50\%$$

50%

14

A grocer buys a 25 kg sack of potatoes for £15.
 He puts all the potatoes into 2.5 kg bags.
 He sells each bag for £2.10.
 He sells all the bags.
 Work out his percentage profit.

(4 marks)

$$\text{Number of bags} = 25 \div 2.5 = 10$$

$$\text{Total sales} = 10 \times £2.10 = £21$$

$$\text{Profit} = 21 - 15 = £6$$

$$\text{Percentage profit} = 6 \div 15 = 0.4 = 40\%$$

40%

15 Jess bought a house for £240 000.

Its value fell by 5% in the first year, then rose by 10% in the second year.

At the end of the second year Jess sold the house for its value then.

Work out her percentage profit.

(4 marks)

Year 1: $\times 0.95$

Year 2: $\times 1.1$

$$240\,000 \times 0.95 = 228\,000$$

$$228\,000 \times 1.1 = 250\,800$$

$$\text{profit} = 250\,800 - 240\,000 = 10\,800$$

$$= \frac{10\,800}{240\,000} \times 100$$

4.5%

16 Priya buys 50 mugs for £3.20 each. Five of the mugs are broken and cannot be sold.

She sells the other mugs for the same price each. She wants to make at least 25% profit on the total amount she paid.

Work out the lowest price per mug, to the nearest penny, that she can charge.

(4 marks)

$$\text{cost} = 50 \times 3.20 = 160$$

$$\text{target} = 160 \times 1.25 = 200$$

$$\text{Mugs to sell} = 50 - 5 = 45$$

$$200 \div 45 = 4.444\dots$$

Round UP so the target is met

$$45 \times 4.44 = 199.80 \text{ (too low)}$$

£4.45

17 Ben's monthly electricity bill was £96. It went up by 15%.

Ben's monthly broadband bill was £30. It went up by 40%.

Ben says, "My broadband bill went up by more money than my electricity bill."

Is Ben correct? You must show your working.

(4 marks)

$$\text{Electricity increase} = 15\% \text{ of } £96 = 0.15 \times 96 = £14.40$$

$$\text{Broadband increase} = 40\% \text{ of } £30 = 0.4 \times 30 = £12$$

£14.40 > £12, so Ben is not correct

18

The membership of running club A increased from 1500 to 1725.

The membership of running club B increased from 2400 to 2700.

Cam says, "Club B had the greater percentage increase because its membership went up by more people."

Show that Cam is wrong.

(4 marks)

$$\text{Club A increase} = 1725 - 1500 = 225, \text{ and } 225 \div 1500 = 0.15 = 15\%$$

$$\text{Club B increase} = 2700 - 2400 = 300, \text{ and } 300 \div 2400 = 0.125 = 12.5\%$$

$15\% > 12.5\%$, so club A had the greater percentage increase and Cam is wrong

19

A florist buys 60 roses for a total of £45.

She sells all 60 roses at the same price each.

She wants to make a profit of at least 40%.

Work out the least possible price for each rose.

(5 marks)

For a 40% profit the total sales must be at least $45 \times 1.4 = £63$

$$\text{Price per rose} = 63 \div 60 = £1.05$$

So the least possible price is £1.05 per rose

£1.05

20

Rob and Sita buy a boat for £6400.

They pay for the boat in the ratio 5 : 3.

Later they sell the boat for £8800.

They share the money from the sale in the ratio 7 : 4, with Rob taking the larger share.

Work out Rob's percentage profit on the money he paid.

(5 marks)

Buying

$$5 + 3 = 8 \text{ parts, so } 1 \text{ part} = 6400 \div 8 = £800. \text{ Rob paid } 5 \times 800 = £4000$$

Selling

$$7 + 4 = 11 \text{ parts, so } 1 \text{ part} = 8800 \div 11 = £800. \text{ Rob receives } 7 \times 800 = £5600$$

$$\text{Rob's profit} = 5600 - 4000 = £1600$$

$$\text{Percentage profit} = 1600 \div 4000 = 0.4 = 40\%$$

40%