Test answers - Percentage change and simple interest

Year: Year 9 · Duration: 45 minutes · /20

Answer to Question 1 (4 marks)

a. An increase of 15% means the new amount is 115% of the original, which is 1.15 as a decimal (1 mark for the multiplier). Then $240 \times 1.15 =$**£276** (1 mark).
b. A decrease of 12% leaves $100 - 12 = 88\%$, so the multiplier is 0.88 (1 mark). Then $650 \times 0.88 =$**£572** (1 mark).

Check (a) the long way: 10% of £240 is £24 and 5% is £12, so 15% is £36, and $240 + 36 = 276$. Check (b): 12% of £650 is $65 + 13 = 78$ pounds, and $650 - 78 = 572$. The multiplier method does the whole calculation in one step and is the quickest on a calculator.

Answer to Question 2 (4 marks)

a. The change is $45 - 36 = £9$, an increase (1 mark). Divide by the original price and multiply by 100: $\frac{9}{36} \times 100 =$**25% increase** (1 mark).
b. The change is $50 - 42 = £8$, a decrease (1 mark). Divide by the original price: $\frac{8}{50} \times 100 =$**16% decrease** (1 mark).

Always divide by the original value, not the new one. Dividing by 45 in part (a) would give 20%, which is wrong. A multiplier check also works: $36 \times 1.25 = 45$ and $50 \times 0.84 = 42$, so both answers are confirmed.

Answer to Question 3 (4 marks)

a. After a 20% reduction the coat costs 80% of the original, so the multiplier is 0.8 (1 mark). £48 is the result of multiplying by 0.8, so divide to go back: $48 \div 0.8 =$ **£60** (1 mark). Check: $60 \times 0.8 = 48$.
b. After a 5% increase the rent is 105% of the original, so the multiplier is 1.05 (1 mark). Divide: $630 \div 1.05 =$**£600** per month (1 mark). Check: $600 \times 1.05 = 630$.

The common wrong method in (a) is to add 20% of £48 to get £57.60. That fails because the 20% was taken from the original price, not from £48.

Answer to Question 4 (4 marks)

a. Simple interest uses $I = \dfrac{PRT}{100}$ with $P = 2000$, $R = 3.5$ and $T = 4$: $\dfrac{2000 \times 3.5 \times 4}{100}$ (1 mark) =**£280** (1 mark).
b. Add the interest to the money invested: $2000 + 280 =$**£2 280**. (1 mark)
c. Each year earns the same interest, $2000 \times 3.5 \div 100 = £70$. So £140 needs $140 \div 70 =$**2 years**. (1 mark)

With simple interest the interest is always worked out on the original £2 000, which is why every year gives exactly £70. Check (a): $4 \times 70 = 280$. Compound interest would give slightly more, because the interest itself would earn interest from the second year.

Answer to Question 5 (4 marks)

a. Apply the 25% reduction first, multiplier 0.75: $120 \times 0.75 = £90$ (1 mark). Then take a further 10% off the new price, multiplier 0.9: $90 \times 0.9 =$**£81** (1 mark).
b. A single 35% reduction uses multiplier 0.65: $120 \times 0.65 = £78$ (1 mark). This is not £81, so Dev is **wrong** (1 mark).

The second discount is 10% of £90, not of £120, so it saves only £9 rather than £12. The two multipliers combine as $0.75 \times 0.9 = 0.675$, which is a 32.5% reduction overall. Successive percentage changes must be multiplied, never added.