Test answers - Fractions, decimals and percentages

Year: Year 8 · Duration: 45 minutes · /20

Answer to Question 1 (4 marks)

a. Divide the numerator by the denominator: $7 \div 8 =$**0.875** (1 mark). Multiply by 100 to get a percentage: **87.5%** (1 mark).
b. Short division of 4 by 11 gives 0.363636..., with the digits 3 and 6 repeating for ever. Put dots over the first and last digits of the repeating block: $0.\dot{3}\dot{6}$. (1 mark)
c. Change everything into decimals: 0.6, $\frac{5}{8} = 0.625$ and 61% = 0.61. Compare the hundredths digits: 0.60, 0.61, 0.625. The order is **0.6, 61%,** $\frac{5}{8}$. (1 mark)

Check (a): $\frac{1}{8} = 0.125$, and seven of these make 0.875. Writing 0.6 as 0.60 in (c) avoids thinking it is bigger than 0.61.

Answer to Question 2 (4 marks)

a. Build 35% from simpler percentages (1 mark for method). Start from 10%, which is $240 \div 10 = £24$; three lots of it make 30%, or £72. Halving £24 gives 5%, which is £12. Then $35\% = 72 + 12 =$**£84** (1 mark).
b. An increase of 15% gives 115% of the original, so the multiplier is 1.15: $64 \times 1.15 =$**£73.60**. Write money with two decimal places. (1 mark)
c. Write 36 as a fraction of 48 and simplify: $\frac{36}{48} = \frac{3}{4} = 0.75 =$**75%**. (1 mark)

Check (a) with a multiplier: $240 \times 0.35 = 84$. Check (b): 15% of 64 is $6.40 + 3.20 = 9.60$, and $64 + 9.60 = 73.60$.

Answer to Question 3 (4 marks)

a. A 15% reduction leaves $100 - 15 = 85\%$ of the price, so the multiplier is 0.85 (1 mark). Sale price $= 320 \times 0.85 =$**£272** (1 mark).
b. A 15% rise uses the multiplier 1.15: $272 \times 1.15 = £312.80$ (1 mark). This is **not** £320; it is £7.20 less. The rise is 15% of £272, a smaller amount than the £48 that was taken off £320, so the price does not get back to where it started (1 mark).

The two changes together multiply the price by $0.85 \times 1.15 = 0.9775$, which is a 2.25% overall fall. Percentage changes cannot simply be added and subtracted.

Answer to Question 4 (4 marks)

a. After a 30% reduction, £42 is 70% of the original price (1 mark). Divide by the multiplier: $42 \div 0.7 =$**£60** (1 mark).
b. Including 20% VAT, £65 is 120% of the price before VAT (1 mark). Divide by 1.2: $65 \div 1.2 = 54.166\ldots$, which is **£54.17** to the nearest penny (1 mark).

Check (a): 30% of £60 is £18, and $60 - 18 = 42$. Check (b): $54.17 \times 1.2 = 65.00$. A classic mistake is to take 30% off £42 or to find 20% of £65; the percentage always belongs to the original price, not to the new one, so we must divide rather than subtract.

Answer to Question 5 (4 marks)

a. Each year the amount is multiplied by 1.04 (1 mark). After 2 years: $500 \times 1.04^2 = 500 \times 1.0816 =$**£540.80** (1 mark).
b. Keep multiplying by 1.04: year 1 £520, year 2 £540.80, year 3 £562.43, year 4 £584.93, year 5 £608.33 (1 mark for the table of values). The amount first goes over £600 at the end of year 5, so it takes **5 years** (1 mark).

With simple interest Ravi would earn £20 every year and would need exactly 5 years to reach £600, so he would not be over it. Compound interest earns interest on the interest as well, which is why the balance grows a little faster each year.