Topic Check In - 2.03 Percentages

Do questions 1 – 8 without a calculator.

1. Convert the fraction $\frac{3}{5}$ into a percentage.

2. Calculate 40% of £3.50.

3. Calculate 15 out of 20 as a percentage.

4. Find 12.5% of £48.

5. Increase 40 cm by 10%.

6. William scores 16 out of 25 in a test. Emily gets 64%. Who did better?
   Show your calculations.

7. Rahan wants to buy a £50 watch from a shop. His mother tells him to wait until the winter sale. At the start of the sale the price of the watch is reduced by 20%. On the final day, the sale price is reduced by 10%. Explain how to calculate the actual amount that Rahan will have to pay for the watch on the final day of the sale.

8. Keira buys a dress for £30 in a sale. It was advertised as '25% off'.
   Keira says "25% of £30 is £7.50, so I saved £7.50."
   Explain why she is wrong, and show that she has actually saved £10.

9. Adding 10% to something is equivalent to multiplying by 1.1 (or 110%). Rail fares go up by 10%, and Josie's new season ticket to London costs £1342. Calculate how much **more** she has to pay now than she did before the 10% increase was added.

10. Sasha earns £20 000 per year and asks her boss for a pay rise. Her boss says "I'll raise your salary for the first half of the year by 5%, and raise it by a further 5% for the remaining half of the year." Calculate the equivalent percentage increase in her salary for the whole year.

Extension

Chris invests £1000 in a bank. His investment grows by 10% every year. How many years does it take for Chris's investment to double?

Answers

1. 60%

2. £1.40

3. 75%

4. £6.00

5. 44 cm

6. 16 ÷ 25 × 100 = 64 oe, so they both got 64% and did equally well.

7. Calculation: 50 × (80 ÷ 100) × (90 ÷ 100) = £36 oe

8. It loses 25% of its original price, not its sale price. £30 is equivalent to 75%, so original price is £40 and therefore she has saved £10.

9. 1342 ÷ 1.1 = 1220 so the original season ticket cost is £1220, and the increase is £122.

10. 5% of 10 000 = 500 so she earns £10 500 in the first half of the year.
    5% of 10 500 = 525 so she earns £11 025 in the second half of the year.
    (21 525 – 20 000) ÷ 20 000 × 100 = 7.625% increase for the whole year.

Extension

$1000 \times 1.1^n = 2000$, so $1.1^n = 2$.
Using a calculator, $1.1^7 = 1.948\ldots$, $1.1^8 = 2.143\ldots$, so the investment doubles after 8 years.

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GCSE (9–1) MATHEMATICS

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Convert a fraction to a percentage without a calculator.			
AO1	2	Calculate a simple percentage of a quantity without a calculator.			
AO1	3	Calculate one quantity as a percentage of another.			
AO1	4	Calculate a percentage of a quantity without a calculator.			
AO1	5	Increase a quantity by a percentage without a calculator.			
AO2	6	Compare fractions and percentages in context.			
AO2	7	Calculate a repeated percentage decrease of a quantity.			
AO2	8	Recognise that percentages are always calculated from the original value.			
AO3	9	Find the original value when a quantity has been increased by a given percentage.			
AO3	10	Calculate a repeated percentage increase of a quantity and calculate the overall percentage change.			

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