Proportion

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

4 pens cost £3. Find the cost of 10 pens (unitary method).

Step 1 · Find the cost of ONE pen

£3 ÷ 4 = £0.75 per pen

Step 2 · Multiply by the new quantity

£0.75 × 10 = £7.50

Answer: £7.50

Check: £7.50 ÷ 10 = £0.75 per pen — matches the unit cost ✓

2. Now try one with the steps

It takes 4 painters 9 hours to paint a hall. How long would 6 painters take?

Step 1 · Identify the proportion type

Step 2 · Find total 'painter-hours' (constant)

Step 3 · Divide by the new number of painters

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. If 5 apples cost £2, how much do 8 apples cost? [2]

2. Is the relationship between speed and travel time (for a fixed distance) direct or inverse proportion? [1]

3. 3 workers can build a wall in 12 days. How long would 6 workers take (assuming the same rate)? [3]

4. y is directly proportional to x. When x=4, y=20. Find y when x=7. [3]

5. y is inversely proportional to x. When x=3, y=8. Find y when x=6. [3]

6. A car uses 6 litres of fuel to travel 90km. How far can it travel on 15 litres? Identify the type of proportion used. [3]

7. 6 eggs cost £1.80. How much do 10 eggs cost? [2]

8. A recipe for 4 people uses 300 g of pasta. How much pasta is needed for 10 people? [2]

9. y is directly proportional to x. When x = 5, y = 30. Find y when x = 8. [2]

10. The exchange rate is £1 = $1.30. Convert $65 into pounds. [2]

11. 2 pumps take 5 hours to empty a pond. How many hours would 5 pumps take? [2]

12. A table shows x = 2, 5, 7 and y = 6, 15, 21. Is y directly proportional to x? If so, write the formula. [2]

13. At 60 mph a journey takes 3 hours. How many hours does it take at 45 mph? [2]

14. 3.5 kg of apples cost £4.55. Find the cost of 2 kg. [2]

15. 8 builders take 15 days to build an extension. How many builders are needed to finish it in 10 days? [3]

16. y is inversely proportional to x. When x = 4, y = 15. Find x when y = 10. [3]

4. Before you hand it in

Treating an inverse proportion problem (e.g. workers and time) proportion

Always ask: quantity increases, does the other increase too (direct) or decrease (inverse)? More workers finishing a job FASTER means less time — that's inverse, not direct.

Using y = kx for an inverse proportion problem

Direct proportion: y = kx (y/x = k, a constant ratio). Inverse proportion: y = k/x (xy = k, a constant product). Identify the relationship type before choosing the formula.

Saying a taxi fare of £3 plus £2 per mile is directly proportional to the distance

In direct proportion, 0 of one quantity gives 0 of the other, and doubling one doubles the other. 1 mile costs £5 but 2 miles cost £7, not £10, so this is not direct proportion. Its graph does not go through the origin.