Worked answers | Ratio, rates and similarity

Direct proportion

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Three kilograms of rice cost 8.40 dollars. Find the price per kilogram. [2 marks]

$8.40 \div 3 = 2.80$.

Answer: 2.80 dollars per kg

2. y is directly proportional to x. If $y = 18$ when $x = 6$, write the rule. [2 marks]

$k = 18 \div 6 = 3$.

Substitute into $y = kx$.

Answer: $y = 3x$

3. Use $y = 2.4x$ to find y when $x = 7$. [2 marks]

$y = 2.4 \times 7 = 16.8$.

Answer: 16.8

4. A printer produces 96 pages in four minutes at a constant rate. How long for 168 pages? [2 marks]

$96 \div 4 = 24$ pages/min.

$168 \div 24 = 7$ min.

Answer: 7 minutes

5. Decide whether the pairs $(1, 5), (3, 15), (8, 40)$ show direct proportion. Explain. [2 marks]

$\frac{5}{1} = \frac{15}{3} = \frac{40}{8} = 5.$

The same multiplier applies to every pair.

Answer: Yes; $y = 5x$.

6. A delivery costs 6 dollars plus 2 dollars per kilometre. Is the total cost directly proportional to kilometres? Explain. [3 marks]

The rule is $C = 6 + 2d$.

The fixed 6 dollars charge means $\frac{C}{d}$ changes; the graph does not pass through the origin.

Answer: No.