Your notes

GCSE Maths: revision notes

Direct and inverse proportion

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Direct proportion

- Two quantities are in **direct proportion** if they increase at the same rate: double one and the other doubles.
- The **unitary method** finds the value of one first: 5 pens cost £3.50, so 1 pen costs 70p and 8 pens cost £5.60.
- The graph of **direct proportion** is a straight line through the origin.

Inverse proportion

- Two quantities are in **inverse proportion** if one goes up as the other goes down at the same rate: double one and the other halves.
- 4 builders take 6 days to build a wall. 1 builder would take 24 days, so 3 builders take 8 days.
- The product stays the same: $4 \times 6 = 3 \times 8 = 24$.
- The graph of **inverse proportion** is a curve that gets closer and closer to the axes.

Proportion equations (Higher)

- $\propto$ means 'is proportional to'. $y \propto x$ means $y = kx$; $y \propto x^2$ means $y = kx^2$; $y \propto 1/x$ means $y = k/x$.
- Find k from the values you are given, then write the equation. If $y \propto x^2$ and $y = 36$ when $x = 3$, then $36 = 9k$, so $k = 4$ and $y = 4x^2$. When $x = 5$, $y = 100$.
- If y is inversely proportional to x and $y = 8$ when $x = 3$, then $k = 24$ and $y = 24/x$. When $x = 6$, $y = 4$.

Key terms

Direct proportion	When one quantity is multiplied, the other is multiplied by the same number.

Inverse proportion	When one quantity is multiplied, the other is divided by the same number.
Unitary method	Finding the value of one unit first, then scaling up.
Constant of proportionality	The number k in equations such as y = kx.
Proportional to (∝)	Linked by direct proportion, such as y ∝ x.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. 5 pens cost £3.50. How much do 8 pens cost?
2. Which graph shows direct proportion?
3. 4 builders take 6 days to build a wall. How long would 3 builders take?
4. y is directly proportional to x. If x doubles, what happens to y?
5. y is inversely proportional to x. If x doubles, what happens to y?
6. A car uses 6 litres of fuel to travel 90 km. How far can it travel on 10 litres?
7. 12 workers take 5 hours to pick a field. How many hours would 20 workers take?
8. What does the symbol ∝ mean?

Answers

1. £5.60
2. A straight line through the origin
3. 8 days
4. y doubles
5. y halves
6. 150 km
7. 3
8. Is proportional to

What to do next

Practise 12 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

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