Guide to:
Proportion (harder)

maths Links

Explanation:

Translate the proportion statement into an algebraic equation using a constant of proportionality **k**: if y is directly proportional to x^n, write $\mathbf{y = kx^n}$; if y is inversely proportional to x^n, write $\mathbf{y = \frac{k}{x^n}}$. Substitute the given pair of values to find k and write the full formula before finding any unknown values.

For compound three-variable problems (where y depends on x and x depends on z), substitute the second formula directly into the first and simplify the powers and constants carefully. Remember to take both roots or the positive physical root when solving for x^2 or $\sqrt{x}$.

Example 1: y is inversely proportional to x^2. Given y = 5 when x = 6, find x when y = 20 (x > 0).

Solution:

$y = \frac{k}{x^2} \Rightarrow 5 = \frac{k}{6^2}$

$k = 5 \times 36 = \mathbf{180}$, so $y = \frac{180}{x^2}$

When y = 20: $20 = \frac{180}{x^2} \Rightarrow x^2 = \frac{180}{20} = 9$

Since x > 0, $x = \sqrt{9} = 3$

Answer: x = 3

Example 2: $P = 3Q^2$ and Q is inversely proportional to $\sqrt{R}$. Given Q = 4 when R = 9, write P in terms of R.

Solution:

$Q = \frac{k}{\sqrt{R}} \Rightarrow 4 = \frac{k}{\sqrt{9}} \Rightarrow k = 4 \times 3 = \mathbf{12}$

Substitute $Q = \frac{12}{\sqrt{R}}$ into $P = 3Q^2$:

$P = 3 \times (\frac{12}{\sqrt{R}})^2 = 3 \times \frac{144}{R}$

Answer: $P = \frac{432}{R}$

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Corbettmaths (Practice)	Qs	Ans	**Maths Takeaway**	Qs	Ans
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