

Direct Proportion

Starter

1. **(Review of last lesson)** The ratio of wool to other materials in two pairs of trousers are A 5 : 2 and B 9 : 4. Which pair of trousers has the greater proportion of wool? Show your working.
2. If 5 pens cost £45, how much will 17 pens cost?

Notes

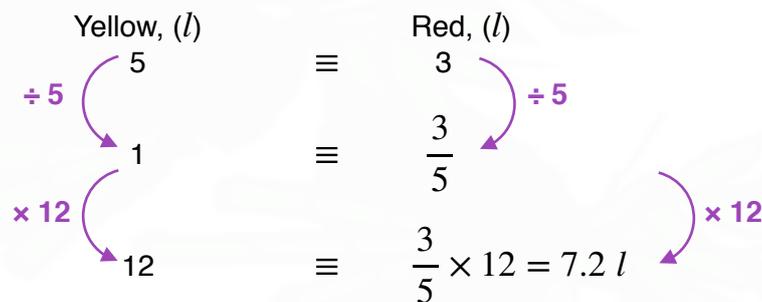
There are two main ways to solve direct proportion questions — the unitary method and the equation method.

E.g. To make orange paint, mix 5 litres of yellow with 3 litres of red paint. How much red paint would you mix with 12 litres of yellow paint?

Method 1: Unitary method

The unitary method finds out how much 1 of the known item is worth.

In the question, we know all about yellow paint (i.e. red is the unknown) so we find how much red paint is equivalent to 1 litre of yellow paint.



Method 2: Equation method

This method uses the ratios to form an equation.

$$\begin{array}{l} \text{Yellow : Red} \\ 12 : x \\ 5 : 3 \end{array}$$

From here we can form an equation by replacing the colons by an = symbol and putting lines between the numbers.

$$\frac{12}{5} = \frac{x}{3}$$

Solve the equation by multiplying by 3:

$$x = 3 \times \frac{12}{5} = 7.2 l$$

You can choose which method to use to answer the following questions.

E.g. 1 On Helen's bike, the back cog makes 10 turns for every 3 turns the front cog makes. If the front cog makes 200 turns, how many does the back cog make?

E.g. 2 5 miles is about 8 km.

- (a) Manzoor cycled 17 miles to a friend's house. How many kilometres is this?
- (b) On the way home, he got a puncture after 14.5 km. How many miles from home was he?

E.g. 3 The lengths of the junior, intermediate and senior cross-country courses are in the ratio 3 : 4 : 9. The intermediate course is 2 km long. How long were the other two courses?

Video: [Direct proportion - unitary method](#)

Video: [Direct proportion - recipes](#)

[Solutions to Starter and E.g.s](#)

Exercise

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Summary

Direct proportion — when one quantity increases, the other one increases by the same ratio.

Unitary method — find out how much 1 item is worth, then multiply up.

Equation method — divide one ratio by the other and solve the equation.

[Textbook answers \(only available during a lockdown\)](#)