

**Mathematics 9**

**Unit 6: Scale Factor and Similarity**

**Lesson #1: Solving Proportions & Metric Conversions**

**Learning Targets:**

1. How to tell when a pair of ratios forms a true proportion.
2. Solving for a missing value in a proportion statement.
3. Convert measurements from one metric unit to another.

**Proportion definition:**

A pair of ratios forms a \_\_\_\_\_ if their **cross-products** are \_\_\_\_\_:

$$\frac{a}{b} = \frac{c}{d} \text{ is a true proportion if } \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

\_\_\_\_\_ and \_\_\_\_\_ are known as the **cross-products**.

**Example:** Are these true proportions? Show how you know using cross-products.

(a)  $\frac{2}{5} = \frac{40}{100}$

(b)  $\frac{3}{15} = \frac{18}{75}$

**Solving Proportions using Cross-multiplication:**

When there is one unknown value in a true proportion, we can solve for its value because the cross-products have to be equal.

**Example:**     *Solve*      $\frac{a}{6} = \frac{4}{12}$

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**Example:**     **Solve**      $\frac{7}{15} = \frac{x}{20}$

**Example:**     **Solve**      $\frac{9}{5} = \frac{3}{y}$

**Example:**     **Solve**      $\frac{11.7}{n} = \frac{17.2}{23.3}$

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**Metric Length Conversions:**

Smallest unit is the millimetre (mm)

Largest unit is the kilometre (km)

**1 mm**

**10 mm = 1 cm**

**1000 mm = 100 cm = 1 m**

**1 000 000 mm = 100 000 cm = 1000 m = 1 km**

**Proportions** can be used to perform metric conversions.

**Example:** How many metres are in 1000 cm?

**Example:** How many metres are in 3.8 km?

**Example:** How many centimetres are in 140 mm?

**Example:** How many metres are in 1587 cm?

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**Example:** How many millimetres are in 3.87 m?

**Example:** How many metres are in 958.1 cm?

**Check your understanding: Handout 1: Solving Proportions #1-22  
Handout 2: Metric Conversions #1-18, #1-16**