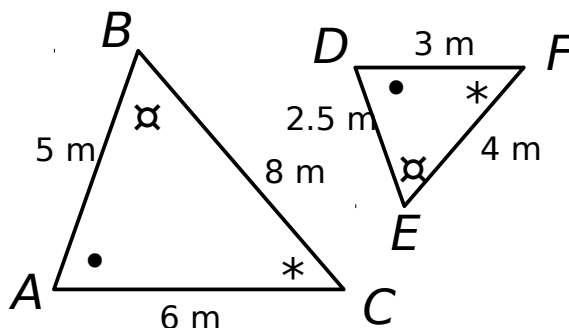


# Similar Triangles

## 1. Similar Triangles

Two triangles are **similar** if they have the **same shape**.  
 Triangles with the same shape will have the **same angles**.  
 Similar triangles may be rotated or flipped.  
 In the diagram,  $\triangle ABC \sim \triangle DEF$ .



## 2. Side Lengths of Similar Triangles

Matching sides in similar triangles have the **same proportion**.  
 The proportion of sides is the **scaling factor**.

$$\frac{5}{2.5} = \frac{8}{4} = \frac{6}{3} = 2$$

$\triangle DEF$  is twice the size of  $\triangle ABC$

## 3. Finding Side Lengths In Similar Triangles

There are two main methods for finding side lengths if two triangles are similar.

Use a Proportion

$$\frac{x}{5} = \frac{6}{2}$$

$$2x = 30$$

$$\frac{2x}{2} = \frac{30}{2}$$

$$x = 15$$

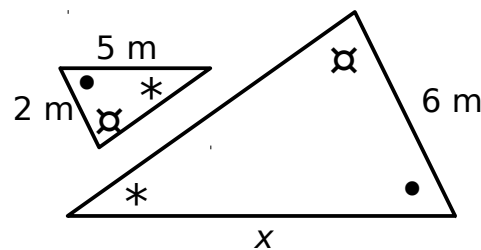
Use the Scaling Factor

$$\frac{6}{2} = 3$$

The larger triangle is 3 times as large as the smaller one.

$$x = 5 \times 3$$

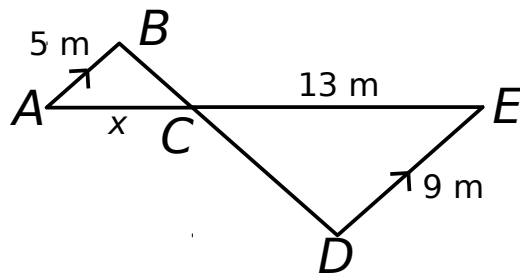
$$= 15$$



## 4. Examples

### A. Show that triangles ABC and EDC are similar.

AB and DE are parallel line segments, so  $\sphericalangle A$  and  $\sphericalangle E$  are alternate angles (Z pattern). Therefore,  $\sphericalangle A = \sphericalangle E$ .  
 Also,  $\sphericalangle B$  and  $\sphericalangle D$  are alternate angles, so  $\sphericalangle B = \sphericalangle D$ .  
 Finally, the two angles at C are opposite, so they are equal. Therefore, the angles are the same in each triangle, and  $\triangle ABC \sim \triangle EDC$ .



### B. Determine the length of x.

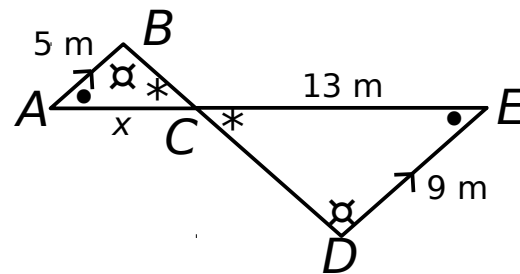
Mark the equal angles to make it easier to identify matching sides. Side AC (x) corresponds to side EC. Side AB corresponds to side DE, but since 9 is not a multiple of 5, it may be easier to use a proportion.

$$\frac{x}{13} = \frac{5}{9}$$

$$9x = 65$$

$$\frac{9x}{9} = \frac{65}{9}$$

$$x \approx 7.2\text{m}$$



Therefore, x is approximately 7.2 metres long.