

## Similar Shapes

### Starter

1. **Rectangle B** is an enlargement of **rectangle A**.  
Calculate the value of length  $x$ .



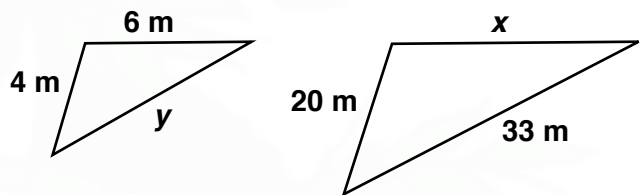
**Working:** To get from 3 to 27, we multiply by 9 – this is the length factor.  
So  $x = 5 \times 9 = 45$

2. The height of triangle  $P$  is 6 cm and the corresponding height on triangle  $Q$  is 24 cm.  
(a) State the length factor from  $P$  to  $Q$ .  
(b) State the length factor from  $Q$  to  $P$ .

**Working:** (a) The length factor from  $P$  to  $Q = \frac{24}{6} = 4$

(b) The length factor from  $Q$  to  $P = \frac{6}{24} = \frac{1}{4}$

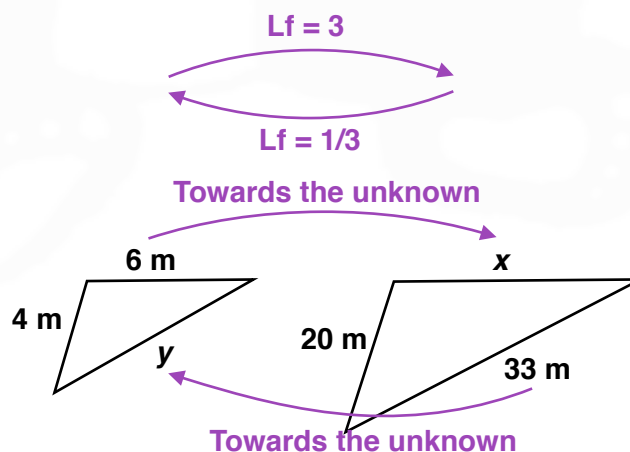
- E.g. 1** The two triangles are similar.  
Find the missing lengths on the triangles.



**Working:** The sides 4 and 20 are corresponding

**Small to big:** length factor from 4 to 20 is  $\frac{20}{4} = 5$  > 1 since small to big

**Big to small:** length factor from 20 to 4 is  $\frac{4}{20} = \frac{1}{5}$  < 1 since big to small

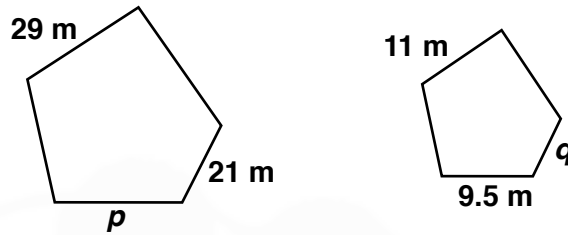


$x = 6 \times 5 = 30$  Go towards the unknown,  $x$

$y = 33 \times \frac{1}{5} = \frac{33}{5} = 6.6$  Go towards the unknown,  $y$

When the length factor is not an integer or an exact decimal, leave it *as a fraction* to avoid rounding errors.

**E.g. 2** The two pentagons are similar. Find the missing lengths.



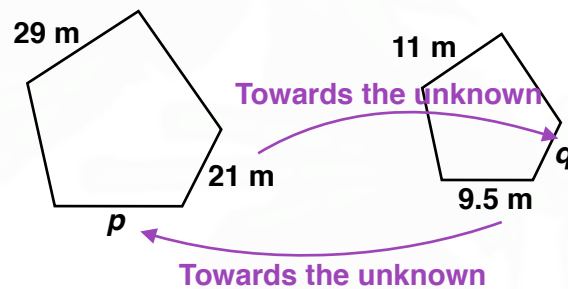
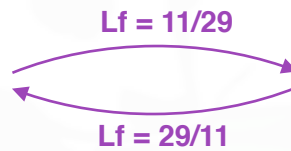
**Working:**

The sides 29 and 11 are corresponding

**Big to small:** length factor from 29 to 11 is  $\frac{11}{29} < 1$  since big to small

**Small to big:** length factor from 11 to 29 is  $\frac{29}{11} > 1$  since small to big

**N.B.** Leave the length factors fractions to avoid rounding errors.



$$q = 21 \times \frac{11}{29} = 8.00 \text{ (3 s.f.)}$$

Go towards the unknown,  $q$

$$p = 9.5 \times \frac{29}{11} = 25.0 \text{ (3 s.f.)}$$

Go towards the unknown,  $p$

When the shape is rotated, use the marked angles to decide which sides correspond to each other.

**E.g. 3** The two triangles are similar. Find the missing lengths.



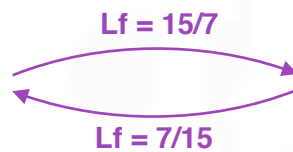
**Working:**

The sides 7 and 15 are corresponding.

Small to big: length factor from 7 to 15 is  $\frac{15}{7} > 1$  since small to big

Big to small: length factor from 15 to 7 is  $\frac{7}{15} < 1$  since big to small

Leave the length factors as fractions since they are not exact decimals.



Sides 6 and  $a$  are corresponding — both next to single line angle.

Sides  $b$  and 8 are corresponding — both next to double line angle.

**Towards the unknown**



**Towards the unknown**

$$a = 6 \times \frac{15}{7} = \frac{90}{7} = 12.9 \text{ (3 s.f.)}$$

Go towards the unknown,  $a$

$$b = 8 \times \frac{7}{15} = \frac{56}{15} = 3.73 \text{ (3 s.f.)}$$

Go towards the unknown,  $b$

**Video:**

[Similar shapes - finding sides](#)

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

**Exercise**

p137 Ex 19.2 Qu 1-7