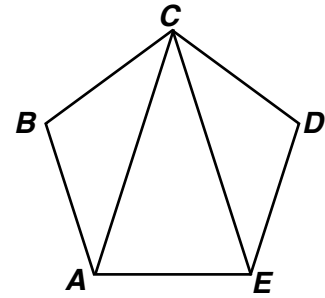


Similar Shapes

Starter

1. **(Review of last lesson)** ABCDE is a regular pentagon. Prove that triangles ABC and CDE are congruent.

Working: S: $BC = CD$ (sides of regular pentagon are equal)
 A: $\angle ABC = \angle CDE$ (interior angles of a regular pentagon are equal)
 S: $AB = DE$ (sides of regular pentagon are equal)
 Since we have SAS, triangles ABC and CDE are congruent.



2. What do we need to **multiply** the 1st number by to get the 2nd number? The first one is done for you.

1st number	2nd number	Multiply by
2	6	3 (because $2 \times 3 = 6$)
6	30	
20	5	
3	7	
9	4	
a	b	

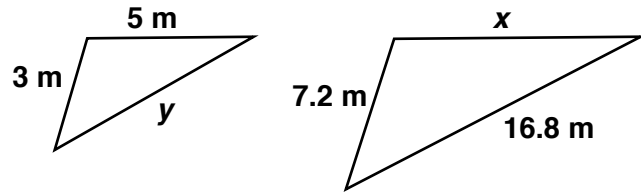
Working:

1st number	2nd number	Multiply by
2	6	3
6	30	5
20	5	$\frac{1}{4}$
3	7	$\frac{7}{3}$
9	4	$\frac{4}{9}$
a	b	$\frac{b}{a}$

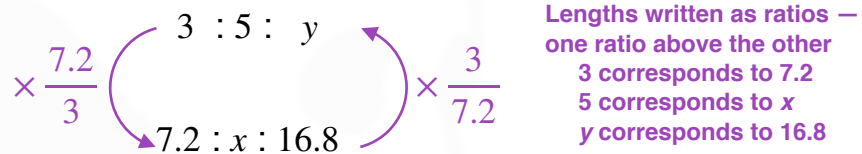
3. (a) What do we multiply 5 by to get 11?
 (b) What do we multiply 11 by to get 5?

Working: (a) $\frac{11}{5}$
 (b) $\frac{5}{11}$

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



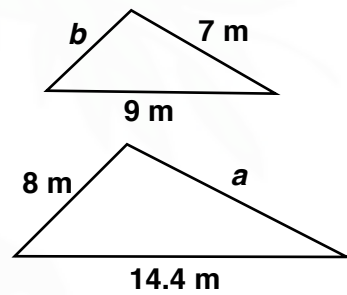
Working: The sides 3 and 7.2 are corresponding
Small to big: length factor from 3 to 7.2 is $\frac{7.2}{3}$ *> 1 since small to big*
Big to small: length factor from 7.2 to 3 is $\frac{3}{7.2}$ *< 1 since big to small*



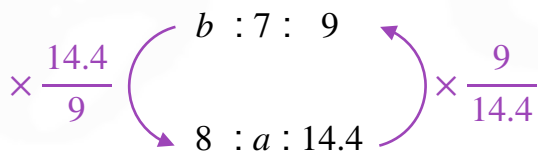
$$x = 5 \times \frac{7.2}{3} = 12 \quad \text{Go towards the unknown, } x \text{ — down arrow}$$

$$y = 16.8 \times \frac{3}{7.2} = 7 \quad \text{Go towards the unknown, } y \text{ — up arrow}$$

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



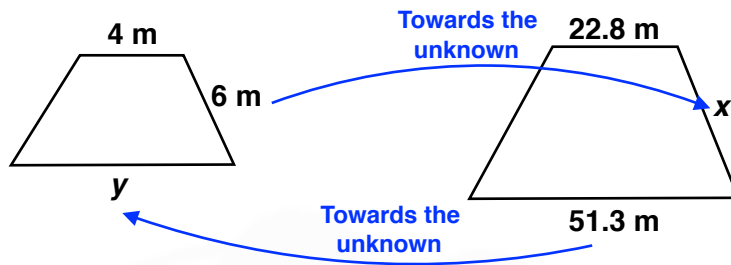
Working: The sides 9 and 14.4 are corresponding
Small to big: length factor from 9 to 14.4 is $\frac{14.4}{9}$
Big to small: length factor from 14.4 to 9 is $\frac{9}{14.4}$



$$a = 7 \times \frac{14.4}{9} = 11.2 \quad \text{Go towards the unknown, } a \text{ — down arrow}$$

$$b = 8 \times \frac{9}{14.4} = 5 \quad \text{Go towards the unknown, } b \text{ — up arrow}$$

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



Working:

The sides 4 and 22.8 are corresponding

Small to big: length factor from 4 to 22.8 is $\frac{22.8}{4} > 1$ since small to big

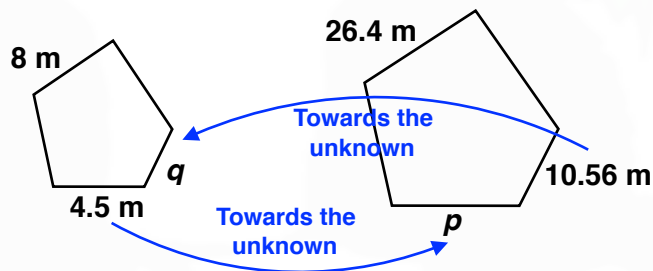
Big to small: length factor from 22.8 to 22.4 is $\frac{4}{22.8} < 1$ since big to small

Draw the **lines** on the diagram

$$x = 6 \times \frac{22.8}{4} = 34.2 \quad \text{Go towards the unknown, } x \text{ – left to right}$$

$$y = 51.3 \times \frac{4}{22.8} = 9 \quad \text{Go towards the unknown, } y \text{ – right to left}$$

E.g. 4 The two pentagons are similar. Find the missing lengths.



Working:

The sides 8 and 26.4 are corresponding

Small to big: length factor from 8 to 26.4 is $\frac{26.4}{8} > 1$ since small to big

Big to small: length factor from 26.4 to 8 is $\frac{8}{26.4} < 1$ since big to small

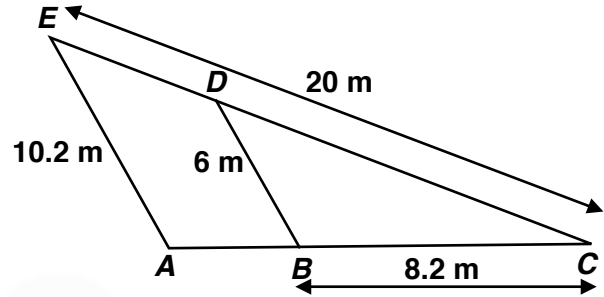
Draw the **lines** on the diagram

$$p = 4.5 \times \frac{26.4}{8} = 14.85 \quad \text{Go towards the unknown, } p \text{ – left to right}$$

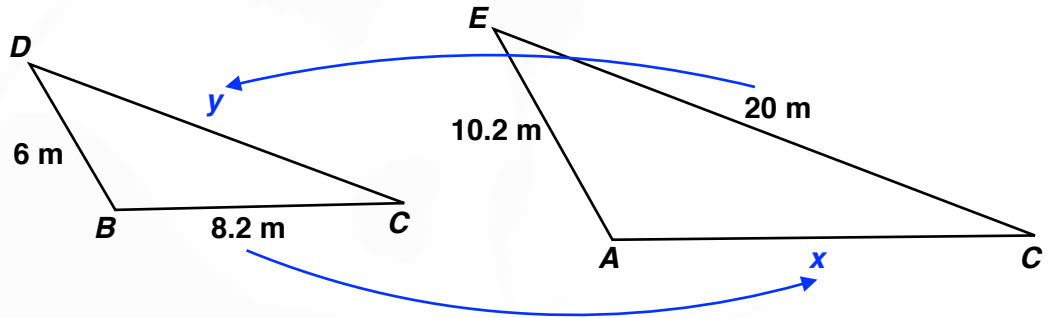
$$y = 10.56 \times \frac{8}{26.4} = 3.2 \quad \text{Go towards the unknown, } q \text{ – right to left}$$

E.g. 5 Find:

- (a) the length AC and
- (b) the length CD



Working: First of all draw two separate diagrams



The sides 6 and 10.2 are corresponding

Small to big: length factor from 6 to 10.2 is $\frac{10.2}{6}$

Big to small: length factor from 26.4 to 8 is $\frac{6}{10.2}$

Draw the **lines** on the diagram

$$x = 8.2 \times \frac{10.2}{6} = 13.94 \quad \text{Go towards the unknown, } x \text{ – left to right}$$

$$y = 20 \times \frac{6}{10.2} = 11.8 \text{ (3 s.f.)} \quad \text{Go towards the unknown, } y \text{ – right to left}$$

Video: [Similar shapes](#)

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

Exercise

- 9-1 class textbook: p448 M13.9 Qu 1-7
- A*-G class textbook: p402 M13.3 Qu 1-6
- 9-1 homework book: p154 M13.9 Qu 1-6
- A*-G homework book: p113 M13.3 Qu 1-6

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