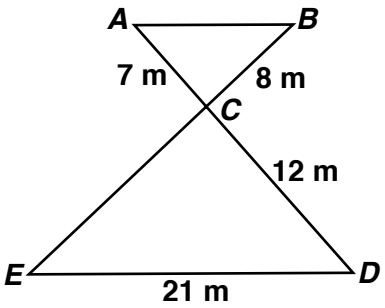
Similar Shapes with Algebra

Starter

1. **(Review of last lesson)**
In the diagram, side AB **is parallel to side** ED**.**
$AC = 7$ m, $BC = 8$ m, $CD = 12$ m and $ED = 21$ m.
Find:
(a) the length of CE
(b) the length of AB



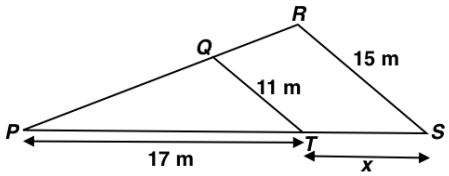
Notes

Questions become more difficult when algebra is introduced. As before the first step is to recognise which lengths are corresponding.

In the example below, three methods are shown — you can choose which one suits you best.

Remember: ***the length factor from*** a ***to*** b ***is*** $\frac{b}{a}$.

E.g. 1 In the diagram, side RS is parallel to side QT**.**
Find the value of x.
Hint: We cannot work out x directly.
But we can work out PS and then…



Working:

1. Length factor method

Small to big: length factor $= \frac{15}{11}$

$PS = 17 \times \frac{15}{11}$ ***leave like this to avoid introducing rounding error***

Then $x = PS - PT = PS = 17 \times \frac{15}{11} - 17 = 6.18$ m

2. Ratio to equation method

11 (QT) corresponds to 15 (RS) $11 : 15$
17 (PT) corresponds to $17 + x$ (PS) $17 : 17 + x$

Form an equation: $\frac{11}{17} = \frac{15}{17 + x}$

Cross multiply: $11(17 + x) = 15 \times 17$

Solve: $187 + 11x = 255$

$11x = 68$

$x = 6.18$

3. Length factor to equation method

Length factor small to big: from 11 to 15 is $\frac{15}{11}$

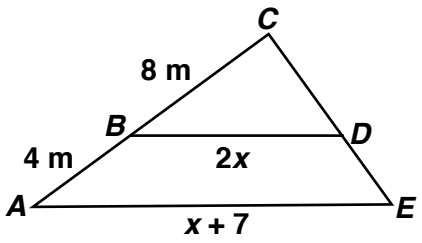
Length factor small to big: from 17 to $17+x$ is $\frac{17+x}{17}$

The length factors must be equal: $\frac{17+x}{17} = \frac{15}{11}$

Cross multiply: $11(17+x) = 15 \times 17$

Solve:
$$187 + 11x = 255$$
$$11x = 68$$
$$x = 6.18$$

E.g. 2 In the diagram, side BD is parallel to side AE.
$AB = 4$ m and $BC = 8$ m
$BD = 2x$ and $AE = x + 7$.
Find the length of AE.



Video: Similar shapes

Solutions to Starter and E.g.s

Exercise

9-1 class textbook:	p450 M13.10 Qu 1-15
A*-G class textbook:	p404 M13.4 Qu 1-15
9-1 homework book:	p156 M13.10 Qu 1-9
A*-G homework book:	p114 M13.4 Qu 1-8

Summary

The length factor from a to b is $\frac{b}{a}$.

Homework book answers (only available during a lockdown)