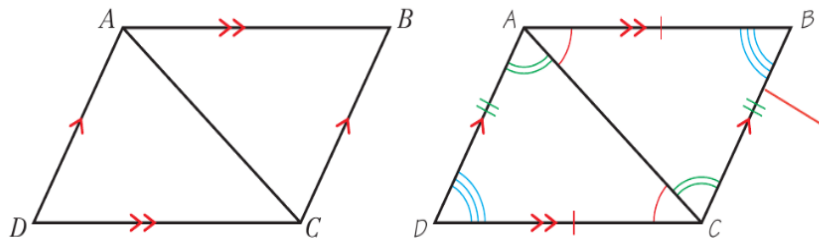


Higher Unit 12 Similarity and Congruence

Example 1

$ABCD$ is a parallelogram. Prove triangle ABC is congruent to ADC .



Mark all equal angles and sides.

Length $AB =$ length CD because opposite sides in a parallelogram are equal.

State why $AB = CD$

Length $BC =$ length AD because opposite sides in a parallelogram are equal.

State why $BC = AD$

Length AC is common to both triangles.

So triangle ABC is congruent to triangle ADC (SSS).

State the condition used to prove congruence.

Congruent triangles have exactly the same size and shape. Their angles are the same and corresponding sides are the same length.

Two triangles are congruent when one of these conditions of congruence is true.

SSS (all three sides equal)

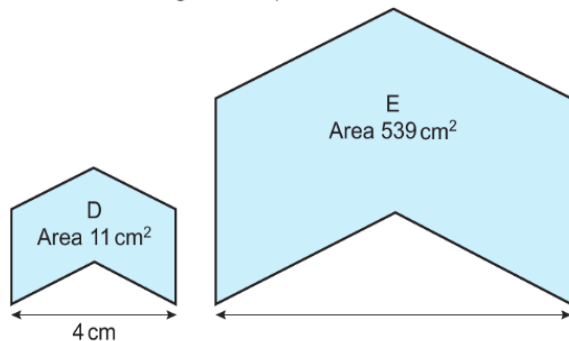
SAS (two sides and the included angle are equal)

AAS (two angles and a corresponding side are equal)

RHS (right angle, hypotenuse and one other side are equal)

Example 3

Shape D is similar to shape E.
Calculate the length of shape E.



$$\text{Area scale factor} = \frac{539}{11} = 49 = k^2$$

$$k = \sqrt{49} = 7$$

Shape E has length $7 \times 4 = 28$ cm

In an enlargement by scale factor k , the area is enlarged by scale factor k^2 .

k is the linear scale factor.

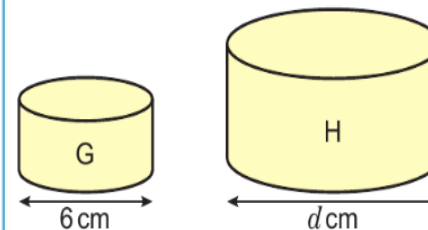
Example 4

Cylinders G and H are similar.

The diameter of G is 6 cm.

The volume of G is 108 cm^3 . The volume of H is 256 cm^3 .

Work out the diameter d of cylinder H.



$$\text{Volume scale factor} = \frac{\text{large}}{\text{small}} = \frac{256}{108} = \frac{64}{27} = k^3$$

$$k = \sqrt[3]{\frac{64}{27}} = \frac{\sqrt[3]{64}}{\sqrt[3]{27}} = \frac{4}{3}$$

$$d = \frac{4}{3} \times 6 = 8 \text{ cm}$$

In an enlargement by scale factor k , the volume is enlarged by scale factor k^3 .