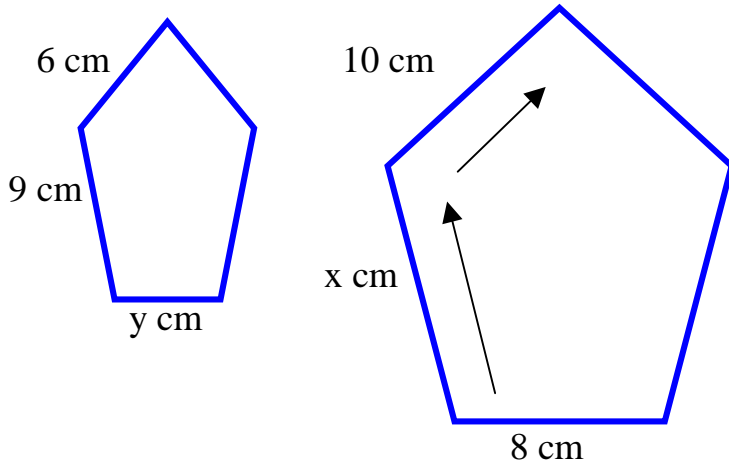


SIMILAR FIGURES

A PAIR OF TWO DIMENSIONAL OR THREE DIMENSIONAL FIGURES ARE SAID TO BE SIMILAR IF ONE IS A PERFECT ENLARGEMENT OF THE OTHER.

If it is known that the figures are similar, then the ratio of their sides is the same for every side.



Use the same method of solution as in similar triangles. Going up the left side and across the top left:

$$\frac{x}{10} = \frac{9}{6} \quad \text{and cross multiply}$$

$$x = \frac{90}{6} = \underline{15 \text{ cm.}}$$

Another way to find x is to work out the scale factor of the enlargement.

The side of length 6 cm. Has grown to a side of length 10 cm.

If the new length had been 12 then the scale factor would simply have been 2.

The scale factor is however, $\frac{10}{6}$. So multiply the side of length 9 cm by this scale factor.

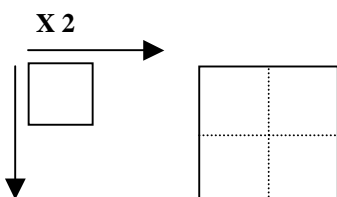
$$9 \times \frac{10}{6} = \underline{15 \text{ cm.}}$$

The length of side 8 cm in the enlarged figure has shrunk to a length of y cm. Use the scale factor for growth but this time **divide**, to get the length of the shrunken side.

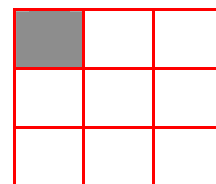
$$8 \div \frac{10}{6} = 8 \times \frac{6}{10} = \frac{48}{10} = \underline{4.8 \text{ cm.}}$$

SIMILAR AREAS

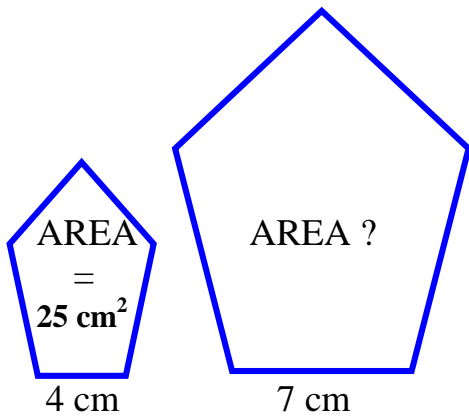
NOTE THAT IF A TWO-DIMENSIONAL SHAPE IS ENLARGED BY A FACTOR OF 2, THE ENLARGEMENT OCCURS IN TWO DIMENSIONS.



THE AREA IS 4 TIMES THE ORIGINAL AREA.
THE AREA MULTIPLYING FACTOR IS 2^2 .
i.e. 4



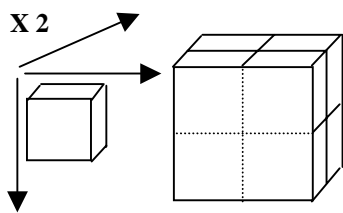
AN ENLARGEMENT BY A FACTOR OF 3 WILL GIVE AN AREA, WHICH IS 9 (3^2) TIMES AS LARGE.



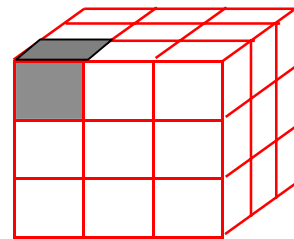
If we enlarge a shape so that the length changes from 4 cm to 7 cm.
 The multiplying factor for length is $\frac{7}{4}$. i.e. 1.75
 The multiplying factor for area is $(1.75)^2$.
 The enlarged area is $(1.75)^2 \times 25 = 76.5625 \text{ cm}^2$.

SIMILAR VOLUMES

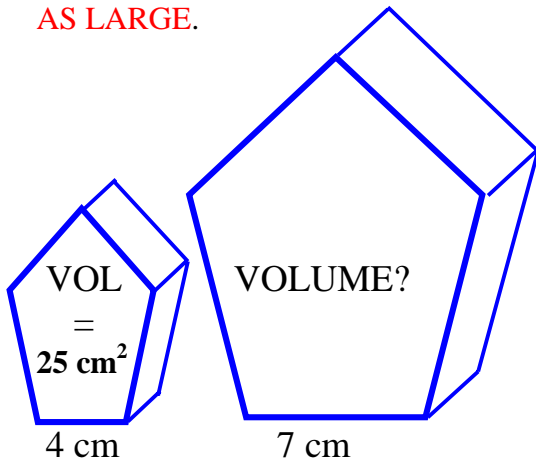
NOTE THAT IF A THREE-DIMENSIONAL FIGURE IS ENLARGED BY A FACTOR OF 2, THE ENLARGEMENT OCCURS IN **THREE** DIMENSIONS.



THE VOLOUME IS 8 TIMES THE ORIGINAL VOLUME.
 THE **VOLUME** MULTIPLYING FACTOR IS 2^3 .
 i.e. 8



AN ENLARGEMENT BY A FACTOR OF 3 WILL GIVE A VOLUME, WHICH IS 27 (3^3) TIMES AS LARGE.



If we enlarge a solid so that the length changes from 4 cm to 7 cm.
 The multiplying factor for length is $\frac{7}{4}$. i.e. 1.75
 The multiplying factor for volume is $(1.75)^3$.
 The enlarged volume is $(1.75)^3 \times 25 = 133.98 \text{ cm}^3$.

SO:

If the linear multiplying factor is k	3	If the volume multiplying factor is v	64
The area multiplying factor is k²	9	The linear multiplying factor is $\sqrt[3]{v}$	4
The volume multiplying factor is k³	27	The area multiplying factor is $(\sqrt[3]{v})^2$	16

If the linear enlargement ratio is 1: k	If the linear enlargement ratio is a: b
The area enlargement ratio is 1: k²	The area enlargement ratio is $a^2 : b^2$
The volume enlargement ratio is 1: k³	The volume enlargement ratio is $a^3 : b^3$