

How does a scale factor work?

When describing an enlargement you must state by **how much the shape has been enlarged**. This is called the scale factor. For example, a scale factor of **2** means that the new shape is **double** the size of the original shape.

When a scale factor is a fraction the shape decreases in size, but we still call this an enlargement. So a scale factor of $\frac{1}{4}$ means that the new shape is **4 times smaller** than the original.

Always check that you don't confuse the scale factor. For example, a scale factor of 2 might be mistaken for a scale factor of $\frac{1}{2}$ or a scale factor of 4 mistaken for a scale factor of $\frac{1}{4}$.

Using scale factor

Watch the video below from [BBC Bitesize](#) on a practical use for scale factor.

Similar shapes

When we use the word 'similar' in everyday language it just means 'nearly the same'.

In mathematics, the meaning is much more precise. Two shapes are said to be similar if they are the same shape but are different sizes.

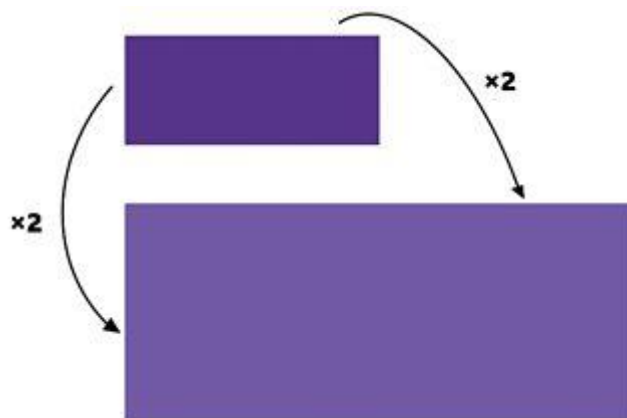
This means that there is always some relationship between corresponding sides of similar shapes.

Similar

Two shapes are similar if they are both exactly the same shape but different sizes.

To tell if two shapes really are similar you have to check that one of them is an enlargement of the other, in other words that all the lengths of one have been scaled up or down (i.e. multiplied or divided by the same amount) to give the corresponding lengths of the other one.

For example, these two rectangles are **similar** and we say that the scale factor is 2.



Not similar

However, these two rectangles are **not similar** because the larger height is twice the size of the smaller one but the width of the larger one is more than twice the width of the smaller one.

This means that the larger one is much more stretched out than the smaller one – not the same shape.

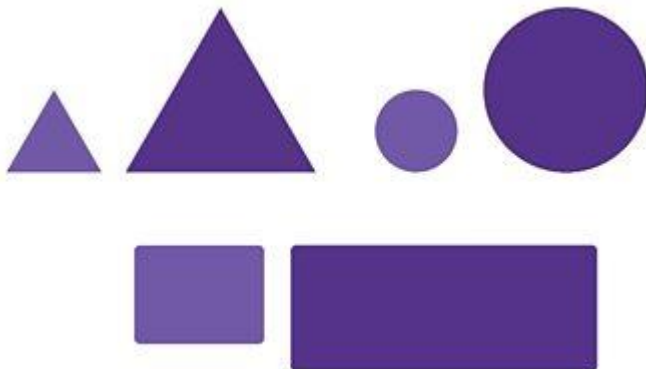


Practise

Activity 1

Similar or not?

Look at these pairs of shapes. Can you explain which pairs are similar and which are not?



Activity 2

Design a shape

Draw a shape of your own design and multiply each of the sides by the same number to create a similar shape. Mark all of the measurements on your diagram. (squared paper may be useful for this).

You could enlarge your shape by a whole number (e.g. 2, 3, 5, etc) or you could multiply by any number (e.g. 2.3, 0.7, $\frac{3}{4}$ etc). Use a calculator if you need to.

Share your shape

Take a picture of the pair of similar shapes you made and send it to a friend who is also doing the Bitesize Daily Maths lessons, but rub out or cover one of the measurements. Challenge them to find out the missing length.

Activity 3

Similar shape brain teaser

[Click here to try the brain teaser on similar shapes](#) from Nrich.

The solution is on the left of the page.

