WorkBook

SIMILARITY & CONGRUENCE

WorkNotes

WorkBook SIMILARITY

Shapes are said to be similar when all proportions are in equal ratio. An easy way to understand this is to consider a photograph.

Eg Below is three prints of a photograph of Blob the Builder. The second is an enlargement that is 1.5 times bigger than the first. If you were to measure any part of the original, then measure any part of the enlargement, you would find that the measurement in the enlargement is always 1.5 times bigger the measurement in the original. (You check this by dividing the measurement in the enlargement by the measurement in the original.)



Enlargement B

When I measured Blob's height, I found the following result;

$$\frac{Blob's \ height \ in \ the \ enl \ arg \ ement \ A}{Blob's \ height \ in \ the \ original} = \frac{7.5 \ cm}{5 \ cm} = 1.5$$

You should check my measurements and calculation. You should also make some other measurements of the Original and Enlargement A and do the calculations using the prints of Blob. You will always get 1.5.

The Original and Enlargement A are similar

When I measured Blob's height, I found the following result;

$$\frac{Blob's \ height \ in \ the \ enl \ arg \ ement \ B}{Blob's \ height \ in \ the \ original} = \frac{7.5 \ cm}{5 \ cm} = 1.5$$

When I measured how wide Blob's two legs are, I found the following result;

$$\frac{Blob's \ legs \ in \ the \ enl \ arg \ ement \ B}{Blob's \ legs \ in \ the \ original} = \frac{2.8 \ cm}{1.4 \ cm} = 2$$

You should check my measurements and calculation. You should also make some other measurements of the Original and Enlargement B and do the calculations using the prints of Blob. You will not always get the same result. It is obvious that Blob has been stretched sideways in enlargement B

The Original and Enlargement B are not similar

WorkBook SIMILARITY

With geometrical shapes, the definition is still the same.



Why?

- 1. If N is a triangle, why isn't it similar to K and G? Because the shape of triangle N is different, it contains a right angle and the other two triangles are isosceles.
- 2. If S is a star, why isn't it similar to B and P? Because star S has four points and the other two stars have five points.

There are various reasons for the other shapes not coming under the description of similar, even though belong to the same group of shapes. While it is easy to see that shapes F, H and U are all round, shape F is not similar to circles H and U. By the way, shape F is an ellipse.

WorkBook



WorkBook SIMILARITY 2

Which shapes are similar? List similar shapes in groups in the answer space.
$\begin{array}{c c} c & c & d & e \\ \hline \\ a & c & c & d & e \\ \hline \\ f & g & h & i & j & k \\ \hline \\ 1 & m & n & o & p & q \\ \hline \\ 1 & s & f & v & w \\ \hline \\ r & t & u & v & w \end{array}$
$\begin{array}{c c} x & y \\ c & y \\ \hline \\ C & D \\ \hline \\ D \\ \hline \\ E \\ \hline \\ C \\ \hline \\ C \\ \hline \\ D \\ \hline \\ E \\ \hline \\ C \\ \hline \\ F \\ \hline \\ F \\ \hline \\ H \\ \hline \\ I \\ \hline \hline \\ I \\ \hline \hline \\ I \\ I$
Answers (List the groups of similar shapes – cross the shapes as you list them)
a, y, M

WorkBook CONGRUENCE

Shapes are said to be **CONGRUENT** when identical in all respects. An easy way to understand this is to consider a photograph.

Eg Below is three photographs of Blob the Builder (Photos A, B, and D), and one photograph of Jack the plumber (Photo C). Photo D is an enlargement of photos A and B that is 1.5 times bigger than photos A and B. If you were to measure any part of photo A or B, then measure any part of the photo D, you would find that the measurement in photo D is always 1.5 times bigger the measurement in photo A or B. (You check this by dividing the measurement in photo D by the measurement in photo A or B.)



Photo A



Photo B



Photo C



Photo D

The photos A and B are identical. Therefore;

The photos A and B are congruent

The photos A and C are photos of different people. Therefore;

The photos A and C are not congruent

Photo D is 1.5 times bigger than photo B and therefore they are not identical. Therefore;

The photos A and D are not congruent

For the same reasons that are listed above;

The photos **B** and **C** are not congruent

The photos **B** and **D** are not congruent

It should be noted that;

The photos A and D are similar The photos B and D are similar

WorkBook CONGRUENCE

With geometrical shapes, the definition is still the same.



Why?

- 1. If N is a triangle, why isn't it congruent to K and G? Because the shape of triangle N is different, it contains a right angle and the other two triangles are exactly the same as each other.
- 2. If B is a star, why isn't it congruent to P and S? Star B is not congruent because it is smaller than the other two stars.

There are various reasons for the other shapes not coming under the description of congruent, even though they belong to the same group of shapes. It is easy to see that shapes L, H and U are circles and shape W is a also a round shape. However, circle U is not congruent to circles H and U because circle U is smaller. By the way, shape W is an ellipse, and cannot be congruent with circles.