Similar Figures

Similarity Transformations

What Are Similar Figures?

Two figures are *similar* if the meet both of the following criteria:

- The corresponding sides are proportional

- The corresponding angles are congruent

*Dilatations are transformations that create similar figures.

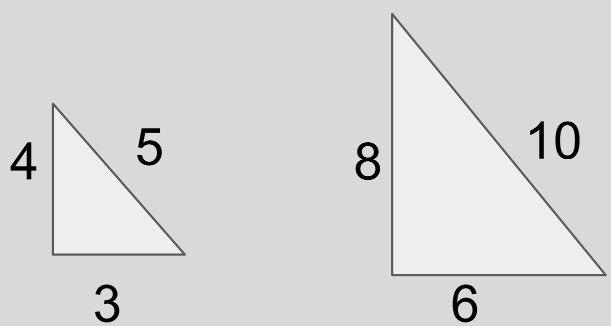
* The scale factor used (or what is sometimes called the similarity ratio), is represented by the variable ***k***

<u>Identifying the Scale Factor:</u>

When given a pair of similar figures, the scale factor (*k*) can be determined by taking a <u>pair of corresponding sides</u> and organizing their measures in the following manner:

Image
Initial

Ex.:



$$\frac{6}{3} = \frac{\mathbf{2}}{\mathbf{1}}$$

* If the smaller triangle is the initial figure, and the enlarged triangle its image, then we can conclude that (*k*) = 2   (the image is two times the size of the initial).

Change in Perimeter (related to *k*):

If two figures are considered similar, the ratio of their perimeters will be equal to the scale factor: ***k***

Ex.: If the scale factor used is $\frac{2}{1}$ (or x 2)

Then the perimeter of the image will also double.

Using the previous example:

Initial figure P= 3 + 4 +5
= 12

Image P= 6 + 8 + 10
= 24

Change: $\mathbf{\frac{24}{12} = \frac{2}{1}}$

Change in Area (related to k):

If two figures are considered similar, the ratio of their areas will be equal to the square of the scale factor: $\boldsymbol{k^2}$

Ex.: If the scale factor used is $\frac{2}{1}$ (or x 2)

Then the area of the image will become $\mathbf{2^2}$ **(or 4)** times larger.

Using the previous example:

Initial Figure: $A = \frac{3 \times 4}{2} = 6$

Image: $A = \frac{6 \times 8}{2} = 24$

Change: $\mathbf{\frac{24}{12} = \frac{4}{1}}$