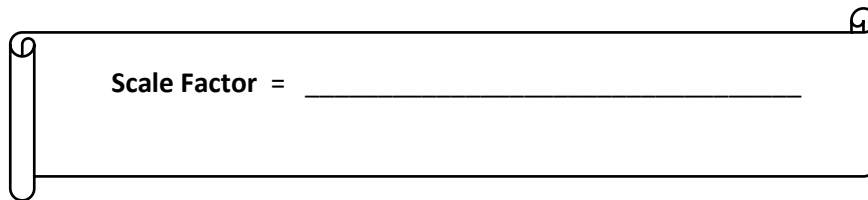**Grade 9 Math**

Scale Diagrams   Name: _____ Date: _____

After this lesson you will be able to:

- Determine the scale factor of a scale diagram
- Determine the length of the missing sides of a scale diagram

Figures that have the same shape, but different sizes are found in everyday life. Some examples include MAPS, BLUEPRINTS, MODELS OF ATOMS, MODELS, TRAINS AND PICTURES. When you compare the drawing of an atom in your Science textbook to the actual drawing, the drawing is much larger. This is called an _____. When you compare the model train to the real train, the model is much smaller. This is called a _____.

To determine how much larger or smaller a "model" is to the "real" object, we must calculate the scale factor. You must measure the corresponding lengths and then use this formula:

Scale Factor = _____

- If the scale factor is larger than 1, then the model is larger than the real object and it is an _____.
- If the scale factor is less than 1, then the model is smaller than the real object and it is an_____.
- If the scale factor is equal to 1, then the model is the exact _____ size as the real object.
- Scale factors can be represented as _____, _____or _____.

Example 1: State whether the transformation is an enlargement, a reduction or neither:

a)   b)   c)

_____   _____   _____
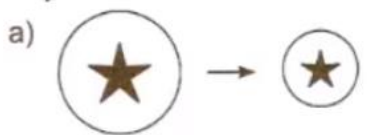
Example 2: Determine the scale factor for each of the following:

(a)   Image   Original
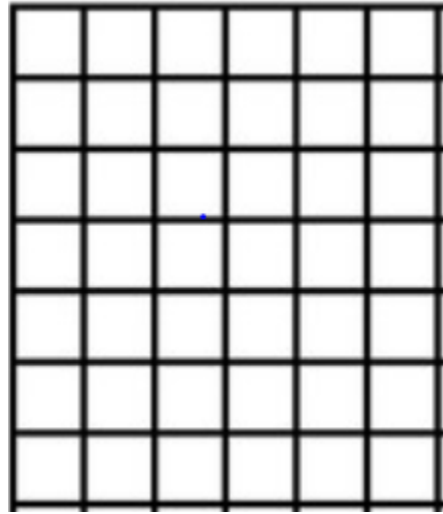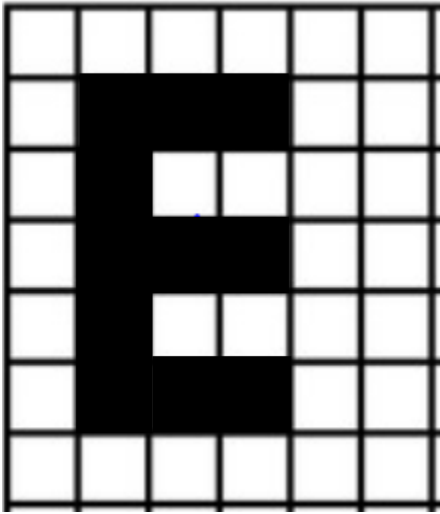

b)   The actual length of a needle is 6 cm. The length of the needle on a scale diagram is 9 cm. What is the scale factor of the diagram?

c) A local farm equipment dealership has model tractors. The length of the actual tractor is 5.6 m. What scale factor was used for the reduction:

8 cm

<u>Example 3</u>: Use a scale factor of 0.5 to reduce the figure below:

If we are given the scale, we can use a proportion to determine the value of either the MODEL size or the REAL size. A proportion is a Math sentence showing 2 equivalent fractions.

For example: $\frac{3}{4} = \frac{6}{8}$ since both the numerator and denominators in the 1st fraction were multiplied by the same value in the second fraction. You must be able to solve a proportions below:

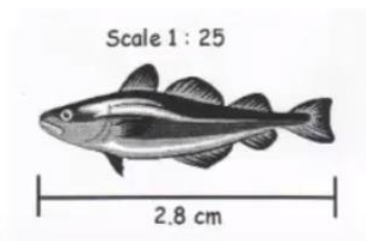<u>REVIEW</u>: Calculate the missing value in each proportion.

(a) $\frac{2}{5} = \frac{\square}{20}$

(b) $\frac{3}{50} = \frac{21}{\square}$

(c) $\frac{3}{5} = \frac{8}{\square}$

When the scale is given, you can use a proprtion to determine the ACTUAL size of the object or the MODEL size of the object.

<u>Example 4</u>: Find the actual size of the fish.

Scale 1 : 25

2.8 cm

Example 5:   If a blueprint of a house that is 16 meters high is drawn to a scale of 1:100, what would the height of the drawing be in cm ?

Example 6: What is the height of the actual fingerprint?

Scale   3:1