

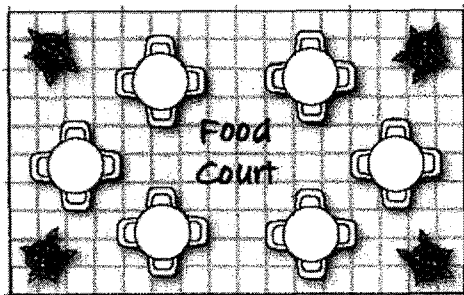
Name \_\_\_\_\_

Date \_\_\_\_\_

Mr. Tallman

### Lesson #31 - Scale Drawings and Scale Factor

The diagram below shows a food court at a shopping mall. Each centimeter in the diagram represents 40 meters in real life measurement.



Part A) Find the length and width of the drawing of the food court (in cm). Round your measurements to the nearest whole centimeter.

Length: 6 cm

Width: 4 cm

Part B) Each centimeter in the diagram represents 40 meters in real life. Using that information and your measurements from part A, find the actual length and width of the food court. Explain how you got your measurements on the lines below.

Actual Length: 240 m

Actual Width: 160 m

I multiplied each dimension by 40

Part C) Find the following ratios and simplify them to unit rates:

$$\frac{\text{drawing length}}{\text{actual length}} = \frac{6}{240} = 0.025$$

$$\frac{\text{drawing width}}{\text{actual width}} = \frac{4}{160} = 0.025$$

What do you notice? Are the lengths and widths proportional to each other? How do you know?

They are proportional b/c the ratios are constant.

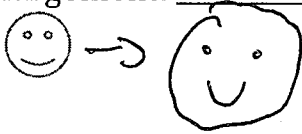
$$K = 0.025$$

Key Terms:

- Scale Drawing: a drawing that is proportional to an original object
- Reduction: a scale drawing that is smaller than the original.



- Enlargement: A scale drawing that is larger than an original.



**\*\*SCALE DRAWINGS ARE ALWAYS PROPORTIONAL TO EACH OTHER\*\***

Example 1) Is the second drawing below a scale drawing of the original?

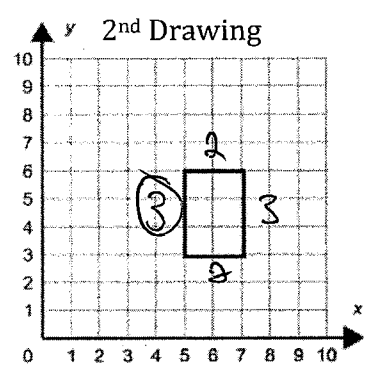
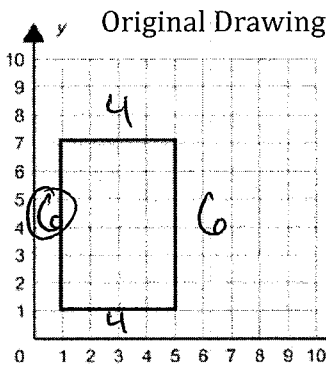
Step 1: Is there a constant of proportionality?

If so, what is it?

$$\frac{y}{x} = \frac{\text{Scale}}{\text{Actual}}$$

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

$$k = \frac{1}{2}$$



Step 2: Is the second image a scale drawing

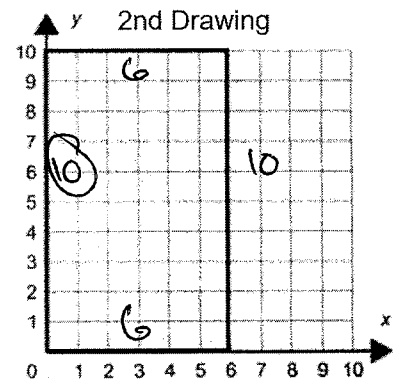
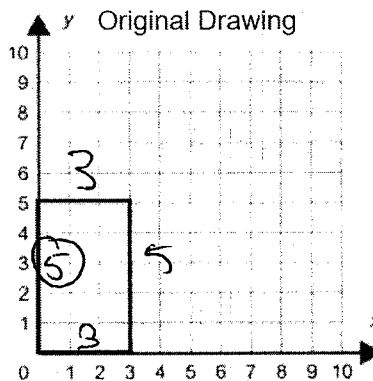
of the first? Explain why or why not.

Yes. The sides are in proportion.

Example 2) Is the second drawing a scale drawing of the original? Show all work and explain.

$$\frac{y}{x} = \frac{\text{Scale}}{\text{Actual}} \quad \frac{10}{5} = \frac{2}{1}$$

Yes. The sides are in proportion +  $k = 2$ .



**Observations:**

What observations can you make about the constant of proportionality (scale factor) of an enlargement?

The Scale factor is greater than 1.

What observations can you make about the constant of proportionality (scale factor) of a reduction?

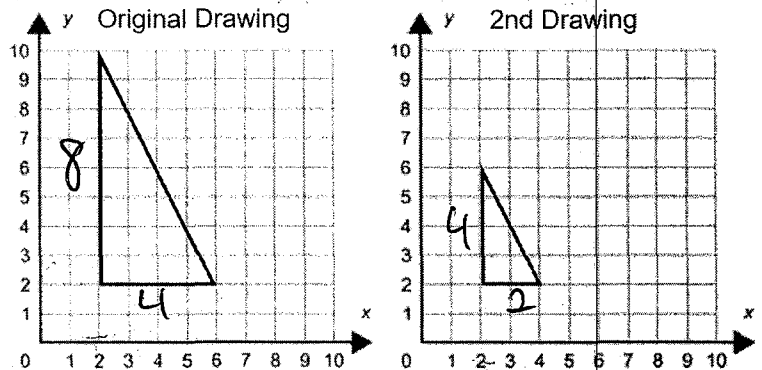
The Scale factor is less than 1 (a fraction)

Example 3) Use the two drawings below to answer the following questions:

A) Is there a constant of proportionality?

If so, what is it? Show all work.

$$\frac{Y}{X} = \frac{\text{Scale}}{\text{Actual}} = \frac{4}{8} = \left(\frac{1}{2}\right)$$



B) Is the second image a scale drawing of the

original image? Explain why or why not.

Yes. The Sides are in proportion + the Scale factor is  $\frac{1}{2}$ .

C) Is the second image a reduction or an enlargement? Explain your answer using what you know about the constant of proportionality (scale factor).

Reduction Since the Scale factor is a fraction.

Example 4) Use the dimensions below to find the scale factor.

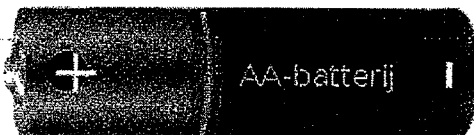
Actual Picture



----- 2 cm -----

$$\frac{Y}{X} = \frac{\text{Scale}}{\text{Actual}} = \frac{8}{2} = \left(4\right)$$

Scale Drawing

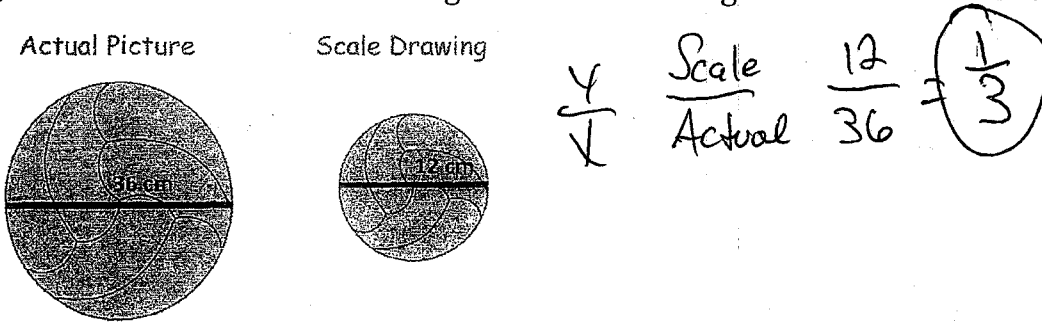


----- 8 cm -----

Is the scale drawing a reduction or enlargement of the actual picture? Explain.

Enlargement Since the Scale factor is greater than 1.

Example 5) What is the scale factor using the scale drawings and measurements below?

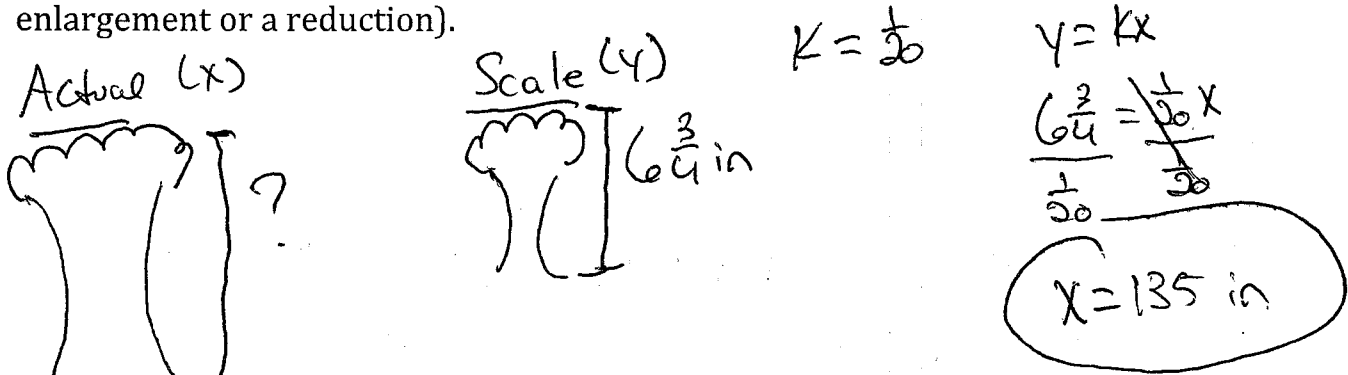


Determine if the scale drawing is a reduction or an enlargement. Explain.

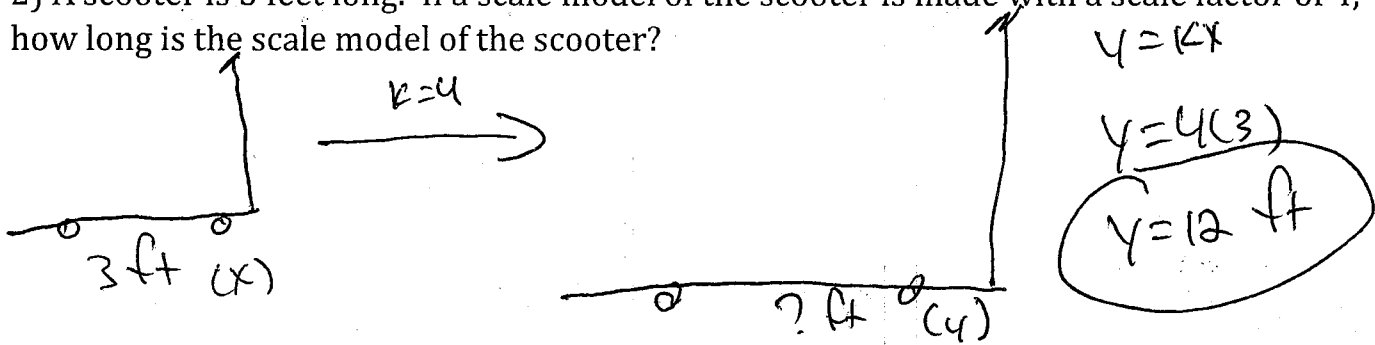
Reduction b/c the scale factor is a fraction.

**Challenge Problems**

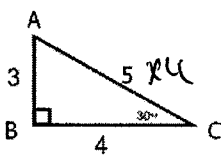
1) A scale drawing of a tree is  $6\frac{3}{4}$  inches tall. The scale factor is  $\frac{1}{20}$ . Find the actual height of the tree. (HINT: Before doing any calculations, predict if the scale drawing is an enlargement or a reduction).



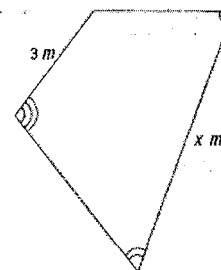
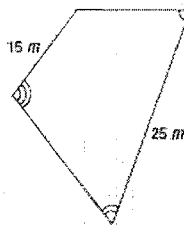
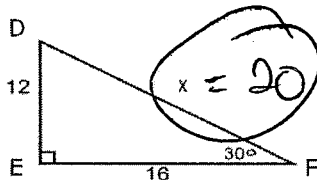
2) A scooter is 3 feet long. If a scale model of the scooter is made with a scale factor of 4, how long is the scale model of the scooter?



3) Determine the missing side of the following figures.



$K = 4$



$K = \frac{1}{5}$   
 $25(\frac{1}{5})$   
 $5 \text{ m}$