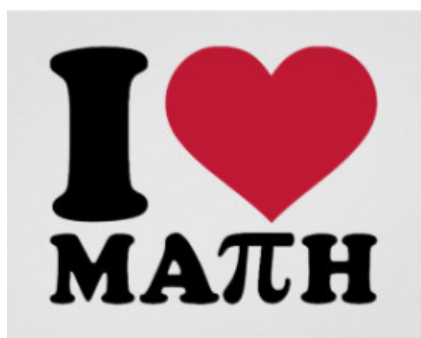


Unit 7  
Similarities  
and



Transformations

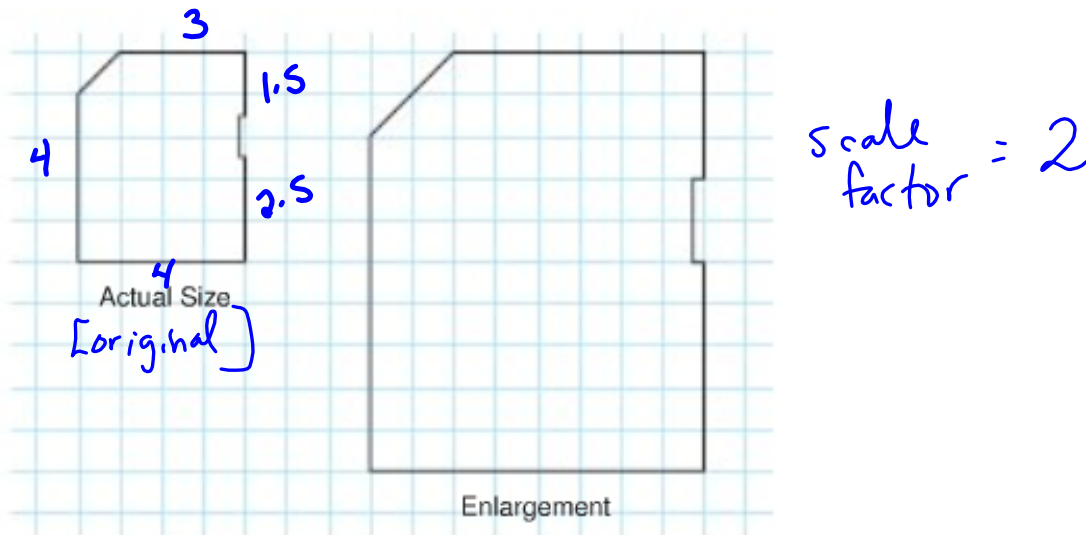


**Investigate**

## DRAW TO SCALE

You will need 0.5-cm grid paper.

Here is an actual size drawing of a memory card for a digital camera and an enlargement of the drawing.



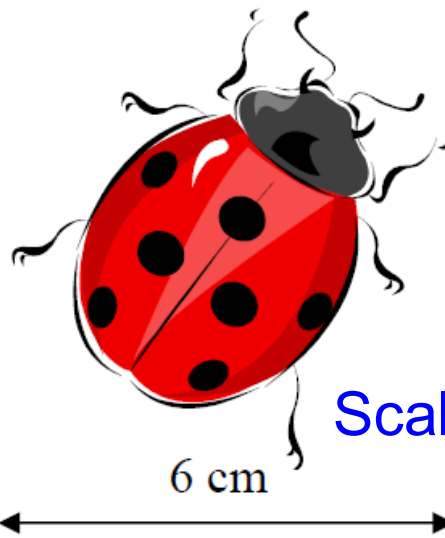
- Copy the drawings on grid paper.  
Measure the lengths of pairs of matching sides on the drawings.  
Label each drawing with these measurements.
- For each measurement, write the fraction:  $\frac{\text{Length on enlargement}}{\text{Length on actual size drawing}}$   
Write each fraction as a decimal.  
What do you notice about these numbers?

# Section 7.1 Scale Diagrams and Enlargements

A diagram that is an enlargement (bigger) or a reduction (smaller) is called a *scale diagram*.



Actual  
[original]

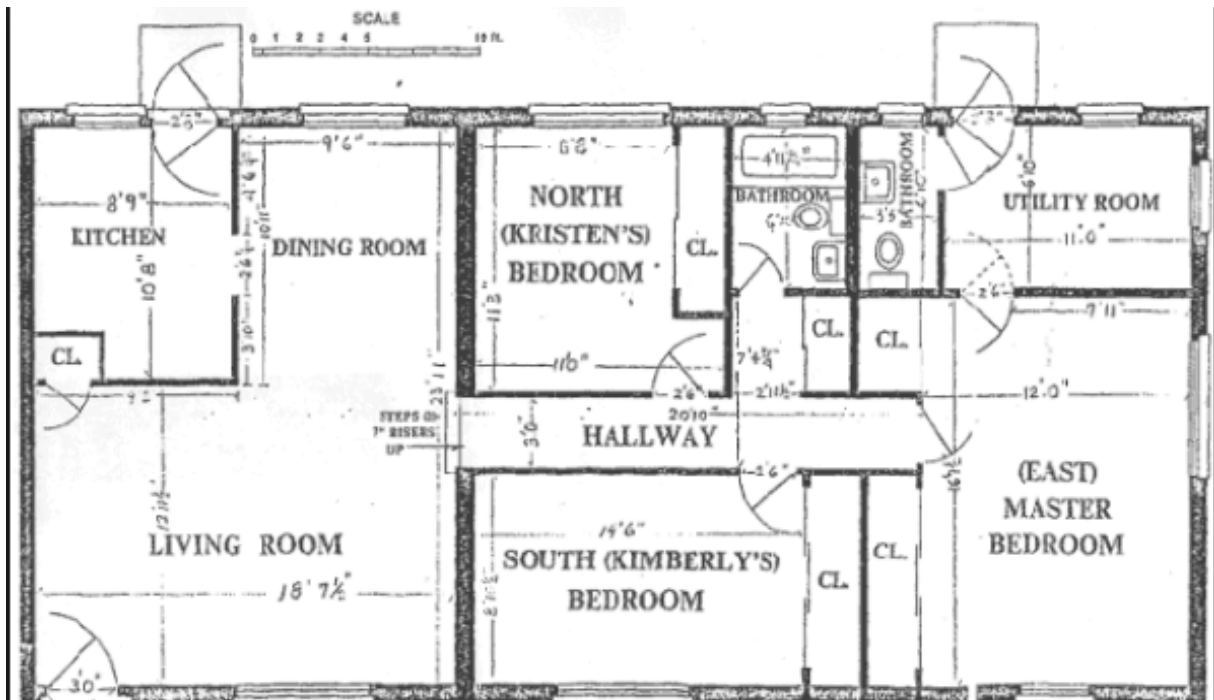


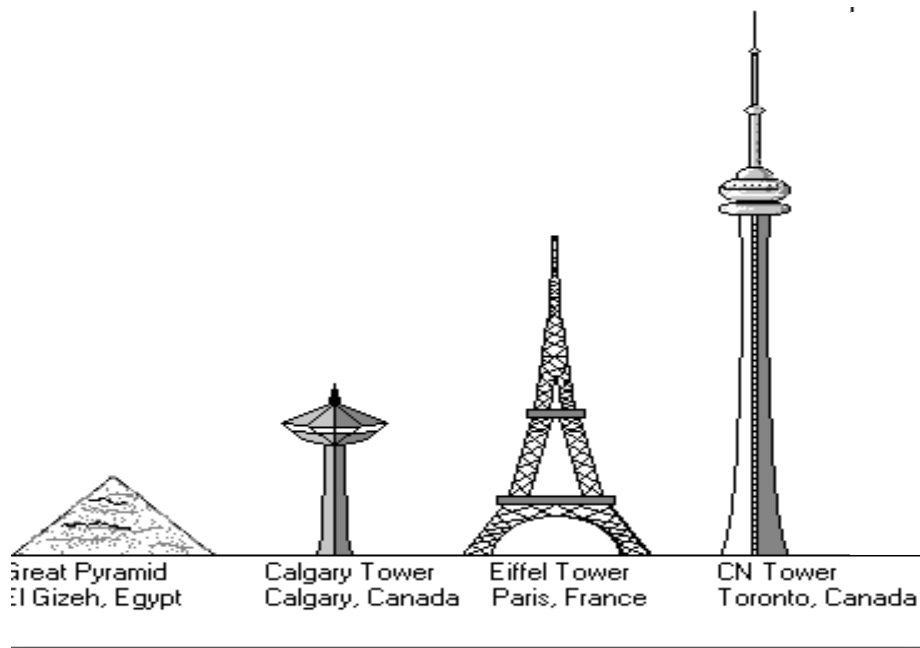
Scale diagram

To calculate the scale factor we use:

$$\frac{\text{Dimension of the scale diagram}}{\text{Dimension of the original diagram}} = \frac{6}{2} = 3$$

Scale factor =  $\frac{\text{scale diagram}}{\text{original}}$   
[S.F.]





SCALE FACTOR=  $\frac{\text{length of enlargement/reduction}}{\text{actual [original] size}}$

The fraction is called a *scale factor* of the diagram [can be expressed as a decimal also]

**Scale Factor:**

- \* **Greater than 1 means enlargement.**
- \* **Less than 1 means reductions**

Enlargement or Reduction

a) S.F. =  $\frac{4}{3}$  [1.3]      b) S.F. =  $\frac{7}{14}$  [0.5]      c) S.F. = 0.4 [  $\frac{4}{10}$  ]

Enlargement                      Reduction                      Reduction

d) S.F. = 1.8 [  $\frac{18}{10}$  ]

Enlargement

Actual [original]



4 cm

5 cm

Scaled Diagram



12 cm

15 cm

1) Is this a reduction or enlargement?

2) What is the scale factor?

Scale factor =  $\frac{\text{Enlargement}}{\text{actual}}$

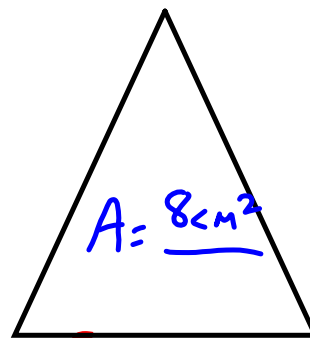
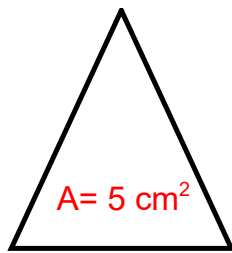
actual

$$= \frac{15\text{cm}}{5\text{cm}} \quad \text{or} \quad \frac{12\text{cm}}{4\text{cm}}$$

$$sf = 3$$

The enlargement is 3 times bigger than the original.

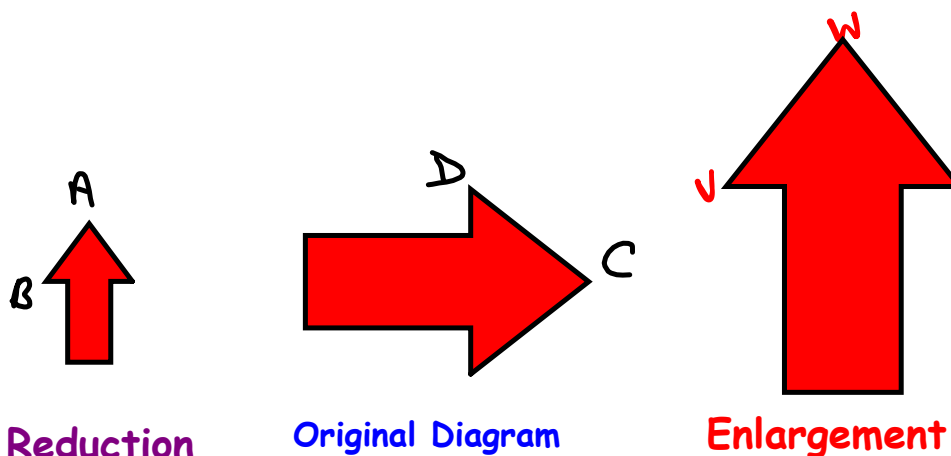




What is the area of a new triangle that is enlarged by a scale factor of 1.6 ?

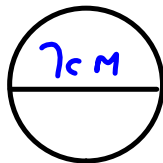
New ??? = Scale factor X original  
 ? [Area, length, height, perimeter, etc] [S.F.]

Matching sides on the original diagram and the scale diagram are called **corresponding sides**.  
 [matching]

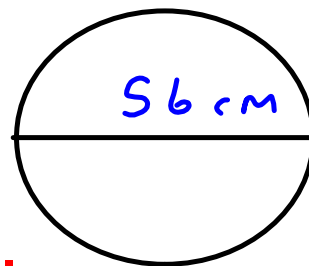


Pairs of corresponding sides all have the same scale factor so we say the lengths are *proportional*.

A. A circle has a diameter 7 cm. The diameter of the enlargement is 56 cm.  
**Determine the scale factor.**



**Original**



**Enlargement**

$$\text{Scale factor (S. F)} = \frac{\text{Enlargement}}{\text{original}}$$

$$\frac{56}{7} = 8$$

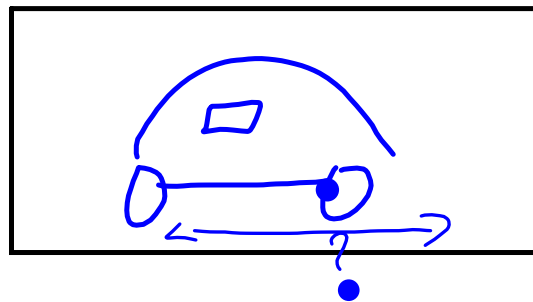
In a photo, the length of a model car is 4.4 cm. The photo is enlarged by a scale factor of 6.5.

**Determine the length of the enlargement.**

Actual



Enlargement



$$\begin{aligned} \text{New } \underline{\hspace{1cm}} &= \text{S.F.} \times \text{original} \\ &6.5 \times 4.4\text{cm} \\ &28.6\text{cm} \end{aligned}$$

Draw a enlargement with a scale factor 3

