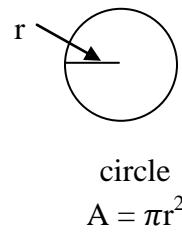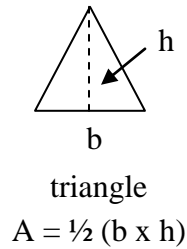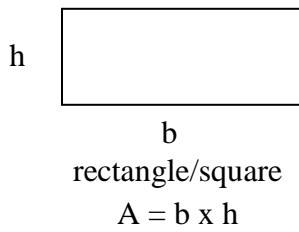In Class Activity - Exploring the Relationship Between Scale Factor and Area

Recall the following formulas for the area of common geometric shapes:

h

b
rectangle/square
A = b x h

h

b
triangle
A = ½ (b x h)

r

circle
A = πr^2

This activity will help to provide you with an understanding of the relationship that exists between areas and scale factors of two-dimensional objects. In groups of 3, complete the following exercise (to be passed in at the end of class):

Using the set of two dimensional shapes provided, complete the following table. Start with a single shape, and then increase the dimensions of the shape according to the scale factor shown. For a single square, the dimensions are 1 unit by 1 unit, and for a rectangle the dimensions are 2 units by 1 unit.

Scale Factor	Object Dimensions		Area (units²)
	Base (units)	Height (units)	
1			
2			
3			
4			
5			

After completing the table above, answer the following questions in the spaces provided:

1) How does the scale factor affect the dimensions of the original two dimensional object?

2) Write a conjecture to describe the relationship between the area of a shape, the scale factor, and the area of a larger similar shape.

3) Prove your conjecture algebraically for the following situation, where Y is an enlargement of the original 2D object (X) with a scale factor of k. (Hint: start by finding the dimensions of Y, then calculate its area).

h ⬜ X   ⬜ Y

b
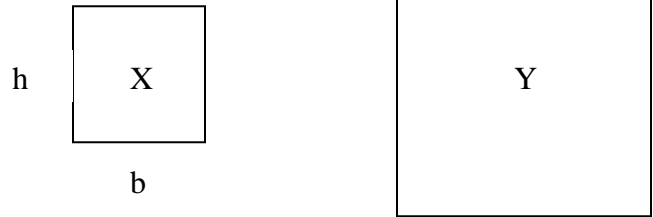
4) Calculate the area of an object that is similar to your original 2D object with a scale factor of 27. What are the dimensions of the new 2D object?

5) Calculate the area of an object that is similar to your original 2D object with a scale factor of 0.5. What are the dimensions of the new 2D object?

6) The areas of two similar circles are 500cm^2 and 125cm^2. Determine the scale factor of the smaller circle to the larger circle.

7) A scale diagram of a circle has an area of 300cm^2. If the original object was scaled-up by a factor of 2 (scale factor =2), what is the radius of the original circle?