Math 213
Sections 11.4

Form yourselves into groups of three to answer the following questions. Turn in one copy for each group with all the group member's names on it. This worksheet is due Tuesday 9/8 by 4:30 pm in my box.

1. Draw a right prism with a height of h units and a triangular base where the triangles sides are of lengths 3,4 and 5 units each.

   (a) How many non-congruent prisms exist that satisfy the above conditions up to congruence? Explain how you know.

   (b) Identify a lateral surface in the above drawing and find the surface area of it.

   (c) How many lateral surfaces are there? What is the surface area of all the lateral surfaces?

   (d) Let the base of the prism be 6 square units. Find the total surface area of the object you drew in 1 in terms of h.

2. Consider a right prism with a height of h and an n-gon as the base. Let n_1 be the length of one side in the n-gon, n_2 be the length of a second side, and so on until n_n which will be the length of the last side.

   (a) What two dimensional shape are each of the lateral sides?

   (b) Find the surface area of the first lateral side in the right prism. The second lateral side? The third?

   (c) How many lateral surfaces are there? What is the surface area of all the lateral surfaces?

   (d) Let the base of the prism have area equal to B square units. Find the total surface area of the right prism in terms of h, n_i, and B.

   (e) Compare your answer with the "Now try this 11-16" on page 787. Are your results consistent with the book? Explain how.

3. Consider a prism (that may not be right) with height h and a regular pentagon as a base.

   (a) What two dimensional shape are each of the lateral sides?

   (b) Let the length of the sides of the pentagon be l. What is the surface area of each lateral side? What is the sum of all the lateral sides?

   (c) Can you generalize your above observations to compute the surface area of a prism with height h, and an n-gon as a base where the length of the i^{th} side has length n_i?

4. The surface area of a cylinder with height h and a base radius of r is:

$$2\pi r(r+h).$$

   Design an activity for fifth graders to discover this. (Assume that they know π is the ratio of the circumference to the diameter and the formula for the area of a circle.)