MATH 1113 DOCUMENTED PROBLEM SOLVING
PROBLEM SET 1

Instructions

(1) Solve the problems below working in your color-rank groups. Feel free to use online resources to help with area, volume, surface area, etc. formulas if you need them.
(2) Write your group name on your solutions and bring them to recitation on Thursday, 3 September 2009, so that you can engage in peer feedback.
(3) When your TA instructs you to do so, exchange solutions with another group and spend a few minutes evaluating their solutions using the DPS rubric. Write your score for each category and feedback to the other group on the form provided. Be sure to note the name of the group you're giving feedback to and your group name.
(4) Get together with the other group and verbally give the group feedback on their solution and receive their feedback on your solution.
(5) Turn in all solutions and feedback forms to your TA.

Problem 1. A manufacturing company is designing a box (closed on the top, bottom, and all four sides) with a square base. The box must have a volume of 1000 cm^3. Determine the surface area A of such a box as a function of the length of a side of the base of the box (meaning *only* one variable appears in A when you write it as a function!). (Note: The box has six sides, all of which should contribute to the surface area formula.) What is the surface area when the length of a side of the base is 10? What is the height of such a box and what does this tell you about the shape of the box?

Problem 2. A farmer wants to fence in a pen for his cattle. He is able to use the north wall of his barn, which measures 250 feet in length, as one side of the pen. He only has 100 feet of fence and insists that the pen be a rectangle. Determine the area A of the pen as a function of the width of the pen.

Remark: These problems are both typical of the first step of a common type of calculus problem. Many students in calculus struggle on such problems not because they cannot do the calculus, but because they cannot do these sorts of steps, which should be learned long before calculus. We'll see a few more situations like this during the semester as part of our aim to prepare you for calculus.