

MA 113 CALCULUS I, FALL 2013
WRITTEN ASSIGNMENT #1
Due Friday, September 6, 2013, at beginning of lecture

Instructions: The purpose of this assignment is to develop your ability to formulate and communicate mathematical arguments. Your complete assignment should have your name and section number on each page, be stapled, and be neat and legible. *Unreadable work will receive no credit.*

You should provide well-written, complete answers to each of the questions. We will look for correct mathematical arguments, complete explanations, and correct use of English. Your solution should be formulated in complete sentences. As appropriate, you may want to include diagrams or equations written out on a separate line. You may read your textbook to find examples of how we communicate mathematics.

Students are encouraged to use word-processing software to produce high quality solutions. However, you may find that it is simpler to add graphs and equations using pen or pencil.

- (5 points) A box has a square base of side length w and height h where w and h are measured in meters. The top of the box is open. The volume of the box is fixed at 5 cubic meters.
 - Draw a sketch of the box and label the sides with the variables w and h .
 - Write a function S which gives the surface area of the box in terms of the variable w .
 - Give the domain of the function S and explain why you chose this domain.
- (5 points) If a , b , and c are the lengths of the sides of a triangle and γ is the angle opposite the side of length c , then the law of cosines is the relation

$$c^2 = a^2 + b^2 - 2ab \cos(\gamma).$$

Use the Pythagorean theorem for the triangle ADB to derive the law of cosines.

You may assume that the triangle is as pictured with the point D between C and B .

