Problem Set 3   Calculus 1   Due 11/12/18

You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 3 points for correct and clearly justified answers.

1.   [B&C] Squares with sides of length x are cut out of each corner of a rectangular piece of cardboard measuring 3 ft by 4 ft. The resulting piece of cardboard is then folded into a box without a lid. Find the volume of the largest box that can be formed in this way.

2.   [B&C] Suppose that the original piece of cardboard in #1 is a square with sides of length *L*. Find the largest box that can be formed in this way.

3.   [B&C] A load is to be suspended 6 m below a high ceiling using cables attached to two supports that are 2 m apart. How far below the ceiling should the cables be joined to minimize the length of cable used?

4.   [B&C] What is the length of the longest pole that can be carried horizontally around a corner at which a 3-ft corridor and 4-ft corridor meet at a right angle?

5.   A dog can run at a rate of 20 ft/s on the shore, but only swims at a rate of 8 ft/s. The dog is currently standing 40 feet from the shore, which runs directly north and south. If a frisbee is thrown so that it lands 30 feet out into the water and 50 feet north of the dog's starting location, where should the dog enter the water to minimize his time to get to the frisbee?