Name: _____ Date: _____

AP Calculus AB More Max-Min Problems (Sheet 3)

1. A farmer has 600 m of fencing with which he plans to enclose a rectangular pen adjacent to a long existing wall. He will use the wall for one side of the pen and the available fencing for the three remaining sides. What is the maximum area that he can enclose this way?

2. The sum of two positive numbers is 48. What is the smallest possible value of the sum of their squares?

3. A rectangular box has a square base whose edge is at least 1 cm, and its total surface area is 600 cm^2. What is the largest possible volume that such a box can have?

4. Three large squares of tin, each of edge length 1 m, have four equal small squares cut from their corners. All twelve resulting small squares are to be the same size. The three large cross-shaped pieces are then folded and welded to make boxes with no tops, and the twelve small squares are used to make two cubes. How should this be done to maximize the total volume of all five boxes?

5. You have been asked to design a one-liter oil can shaped like a right circular cylinder. What dimensions should you use for the can to make the surface area as small as possible? (1 liter $= 1000\ cm^3$)