Calculus   Worksheet #6   Unit 1   page 1   _____
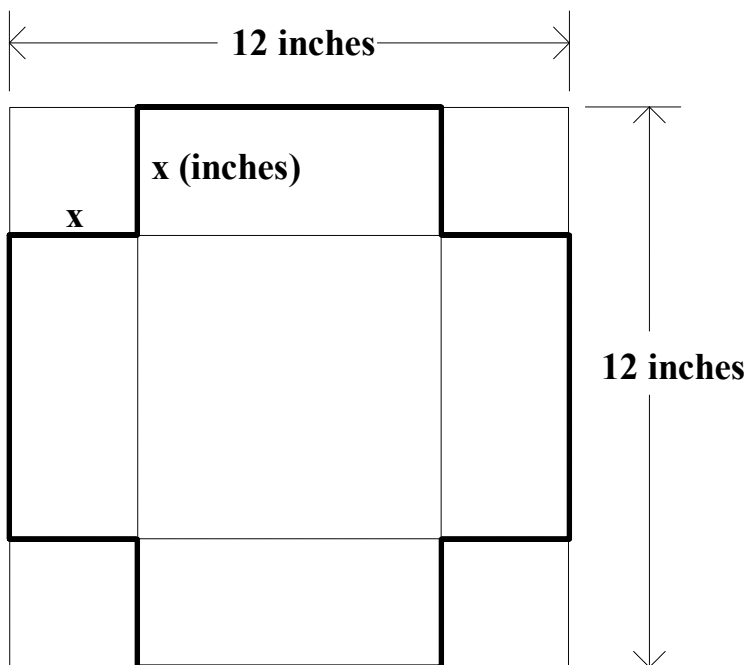
Use calculus to solve the following problems. Show your work and your solutions neatly organized. Express any irrational solutions rounded to three significant digits.

1. A one-foot square piece of metal is to be made into a box without a top by cutting equal squares out of the corners, as shown in the diagram, and bending up the edges. If x represents the length of each side of the square cut-out, then what value of x will result in a box with maximum volume.

12 inches

x (inches)

x

12 inches

2. A rectangle has two sides on the coordinate axes and one vertex in the first quadrant on the line x + 3y = 15. What is the maximum area of the rectangle?

Use calculus to solve the following problems. Show your work and your solutions neatly organized.

3. One side of a rectangle is on the x-axis and its upper two vertices are on the curve $y = 16 - x^2$. What is the maximum area of the rectangle?

4. A piece of sheet metal 24 inches wide is to be bent to form a gutter with a rectangular cross section. Please refer to the diagram. If x represents the width that is bent up along each edge, then what value of x corresponds to a maximum cross sectional area?

x inches

24 in.

x inches

x inches

Gutter - End View