

**Math Xa Fall 2003**  
**Handout: Optimization**  
**November 17, 2003**

*Strategy*

1. Understand the situation. Drawing a picture often helps.
2. Identify the variables – those quantities that can change.
3. Identify the variable you wish to maximize or minimize. Express this variable in terms of the other variables.
4. You will probably have too many variables. Use the restrictions given in the problem to express the variable you wish to optimize as a function of only one variable.
5. Use the problem description to find the domain of this function.
6. Determine the maximum or minimum value of the function using techniques from §10.1 and §10.2.

*Sample Problems*

1. Farmer Brown has 120 m of fencing with which to fence off a rectangular pen adjacent to the side of her barn. What dimensions of the pen yield the largest area?
2. A box with a square base holding  $8000 \text{ cm}^3$  is to be manufactured. Find the dimensions that will minimize the surface area of the box.
3. Find the point on the line  $y = 2x + 5$  that is closest to the origin.
4. A cylindrical can is to be made to hold 1 L of oil. Find the dimensions that will minimize the cost of the metal to manufacture the can.