

## 2.5 Max-Min Problems

💡 **Example 1** The sum of two numbers,  $x$  and  $y$ , is 10. Find the maximum value of  $Q = 3xy + y^2$ . Find the minimum value.

💡 **Example 2** A farmer wishes to build a rectangular corral with three separate pens against the side of a barn with 600 feet of fencing. What are the dimensions that will maximize the area?

💡 **Example 3** A box is to be made from a  $20\text{ cm} \times 32\text{ cm}$  piece of paper by cutting out squares from each corner that are at least  $2\text{ cm} \times 2\text{ cm}$  and folding up the four sides. Find the dimensions of the square to be cut out and the maximum volume of the box.

**Example 4** A circular cylinder is constructed with material that costs \$0.005 per square centimeter for the top and bottom, and \$0.002 per square centimeter for the sides. Find the dimensions of the cylinder that will minimize the cost if the volume of the cylinder is to be 500ml; and find the minimum cost.

**Example 5** A store estimates it will sell 250 clocks each year. Each clock costs the store \$50; each order costs \$300 for shipping and processing; and each clock costs \$35 per year to keep in storage. How many orders should the store place each year and what is the order size that will minimize inventory costs?