

Name: _____ Date: _____ Band: _____
Algebra 2

Quadratic Word Problems HW: Maximization

1. An online music store sells about 4000 songs each day when it charges \$1 per song. For each \$0.05 increase in price, about 80 fewer songs per day are sold. Use the verbal model and quadratic function to determine how much the store should charge per song to maximize daily revenue.

$$\begin{array}{l} \text{Revenue} \\ \text{(dollars)} \end{array} = \begin{array}{l} \text{Price} \\ \text{(dollars/song)} \end{array} \cdot \begin{array}{l} \text{Sales} \\ \text{(songs)} \end{array}$$

$$R(x) = (1 + 0.05x) \cdot (4000 - 80x)$$

2. An electronics store sells 70 digital cameras per month at a price of \$320 each. For each \$20 decrease in price, about 5 more cameras per month are sold. Use the verbal model and quadratic function to determine how much the store should charge per camera to maximize monthly revenue.

$$\begin{array}{l} \text{Revenue} \\ \text{(dollars)} \end{array} = \begin{array}{l} \text{Price} \\ \text{(dollars/camera)} \end{array} \cdot \begin{array}{l} \text{Sales} \\ \text{(cameras)} \end{array}$$

$$R(x) = (320 - 20x) \cdot (70 + 5x)$$

3. A kernel of popcorn contains water that expands when the kernel is heated, causing it to pop. The equations below represent the “popping volume” y (in cubic centimeters per gram) of popcorn with moisture content x (as a percent of the popcorn’s weight).

Hot air popping: $y = -0.76(x - 5.52)(x - 22.6)$

Hot oil popping: $y = -0.652(x - 5.35)(x - 21.8)$



A. For hot-air popping, what moisture content maximizes popping volume? What is the maximum volume?

B. For hot-oil popping, what moisture content maximizes popping volume? What is the maximum volume?