

Name: Selected Answers

Date: \_\_\_\_\_

Homework: Quadratics SF and Extreme Values

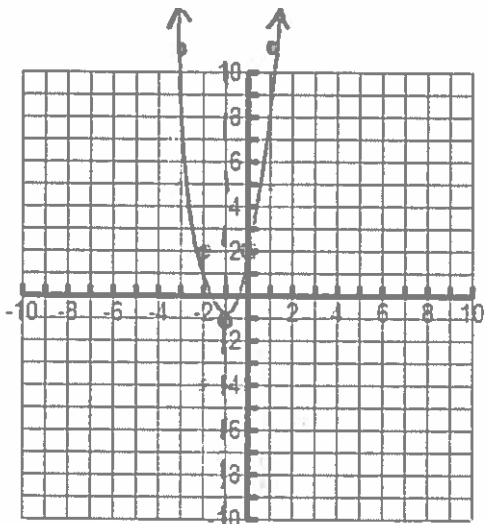
Honors PreCalculus

1. Graph the following functions. Determine the domain and the range as well as over what intervals the functions is increasing and decreasing.

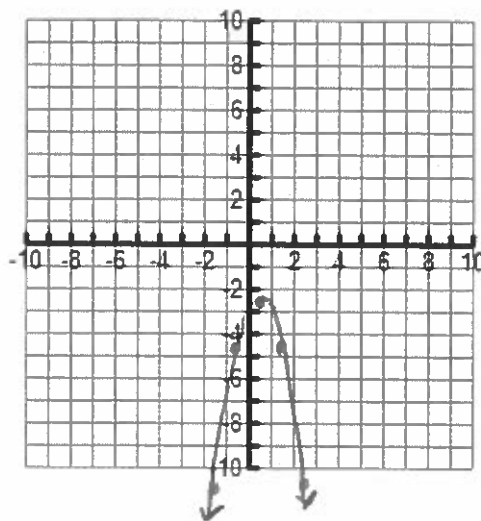
(a)  $f(x) = 3x^2 + 6x + 2$

(b)  $f(x) = -2x^2 + 2x - 3$

$x = -\frac{b}{2a}$



D:  $(-\infty, \infty)$     Inc:  $(-1, \infty)$   
R:  $[-1, \infty)$     Dec:  $(-\infty, -1)$



2. Suppose that the manufacturer of a gas clothes dryer has found that, when the unit price in  $p$  dollars, the revenue  $R$  (in dollars) is  $R(p) = -4p^2 + 4000p$ . What unit price should be established for the dryer to maximize revenue? What is the maximum revenue?

\$500

\$1,000,000

3. The marginal cost  $C$  (in dollars) of manufacturing  $x$  cell phones (in thousands) is given by  $C(x) = 5x^2 - 200x + 4000$ . How many cell phones should be manufactured to minimize the marginal cost? What is the minimum marginal cost?

20 thousand cell phones

\$2000

4. The monthly revenue  $R$  achieved by selling  $x$  wristwatches is figured to be  $R(x) = 75x - 0.2x^2$ . The monthly cost  $C$  of selling  $x$  wristwatches is  $C(x) = 32x + 1750$ .
- (a) How many wristwatches must the firm sell to maximize revenue? What is the maximum revenue?  
(b) Profit is given by  $P(x) = R(x) - C(x)$ . What is the profit function?  
(c) How many wristwatches must the firm sell to maximize profit? What is the maximum profit?

a) 187.5, 7031.25

b)  $P(x) = -0.2x^2 + 43x - 1750$

c) 107.5, 561.25

5. The graph of the function  $f(x) = ax^2 + bx + c$  has a vertex at  $(0, 2)$  and passes through the point  $(1, 8)$ . Find  $a$ ,  $b$ , and  $c$ .

$$a = 6$$

$$b = 0$$

$$c = 2$$

$$f(x) = 6x^2 + 2$$

6. David has 400 yards of fencing and wishes to enclose a rectangular area.
- (a) Write a function for the area of the rectangular enclosure.  
(b) What dimensions would produce the largest area?  
(c) What is the largest area?

a)  $A = -w^2 + 200w$

b/c) 100 yd by 100 yd  
10000 yd<sup>2</sup>

7. A farmer lives on a river bank and wants to create a rectangular plot with the river as one of its borders. He has 2000 meters of fence to build the 3 walls. What is the maximum area he can enclose?

$$l = 1000 \text{ m}$$

$$w = 500 \text{ m}$$

$$\text{max Area} = 500000 \text{ m}^2$$

8. Graph the following piecewise function.  $f(x) = \begin{cases} -\sqrt[3]{4x} + 3, & \text{if } x < 2 \\ -2x + 5, & \text{if } 2 \leq x < 4 \\ \frac{1}{4}x^2 - 3x + 5, & \text{if } x > 4 \end{cases}$

