

Bellwork: A certain company builds computers. The monthly cost for hardware per computer is modeled by the function  $H(x)=x^2-30x+300$ , and the monthly cost for software per computer is modeled by  $S(x)=x^2-26x+200$ , where  $x$  is the number of computers produced, and  $H(x)$  and  $S(x)$  are the corresponding costs in dollars.

Write a function that models the company's total cost

$$H(x)+S(x) = \begin{array}{l} x^2 - 30x + 300 \\ + x^2 - 26x + 200 \\ \hline \end{array}$$

$$11) T(x) = 2x^2 - 56x + 500$$

$$12) T(10) = 2(10)^2 - 56(10) + 500 = \$140$$

$$13) 2(x^2 - 28x + 250)$$

$$2(x^2 - 28x + 196 + 250 - 196)$$

$$T(x) = 2(x-14)^2 + 108$$

14 computers

$$14) \$108$$



## Homework 8.3 and 8.4 Solutions

## Today's Objectives: Review for Unit 8 Test!

1. Given that  $r$  is the positive length of a radius, solve for  $r$ :  $3 \cdot V = \frac{\pi r^2 h}{3} \cdot 3$

$$\sqrt{\frac{3V}{\pi h}} = \sqrt{r^2}$$

$$r = \sqrt{\frac{3V}{\pi h}}$$

$$\frac{3V}{\pi h} = \frac{\pi r^2 h}{\pi h}$$

2. Solve for  $A$ .  $U = A + B - AB$   
 ~~$-B$~~   ~~$-B$~~

$$A = \frac{U - B}{1 - B}$$

$$U - B = A - AB$$

$$\frac{U - B}{1 - B} = \frac{A(1 - B)}{1 - B}$$

3. Solve for  $E$ .  $W = \frac{1}{E} - a + b$   
 ~~$+a$~~   ~~$+a$~~   
 ~~$-b$~~

$$E = \frac{1}{W + a + b}$$

$$W + a - b = \frac{1}{E}$$

4. Find the points of intersection between the line  $y = -3x$  and the parabola  $y = x^2 + 2x + 4$ .

~~$$\begin{array}{r} 4 \\ 4 \end{array} \begin{array}{r} 1 \\ 1 \end{array}$$

$$\begin{array}{r} 5 \\ 5 \end{array}$$~~

$$\begin{array}{l} (-1, 3) \\ (-4, 12) \end{array}$$

$$\begin{aligned} -3x &= x^2 + 2x + 4 \\ +3x &\quad +3x \\ \hline 0 &= x^2 + 5x + 4 \\ y = -3(-1) \quad 0 &= x^2 + 5x + 4 \\ y = -3(-4) \quad 0 &= (x+4)(x+1) \\ &x = -4, -1 \end{aligned}$$

5. Solve the following system:

$$\begin{cases} y = x + 8 \\ y = x^2 - 5x + 8 \end{cases}$$

$$\begin{array}{l} (0, 8) \\ (6, 14) \end{array}$$

$$\begin{array}{l} (0, 8) \\ (6, 14) \end{array}$$

$$\begin{aligned} x + 8 &= x^2 - 5x + 8 \\ -x - 8 &\quad -x - 8 \\ \hline 0 &= x^2 - 6x + 0 \\ &= (x+0)(x-6) \\ &x = 0, 6 \end{aligned}$$

~~$$\begin{array}{r} 0 \\ -6 \end{array} \begin{array}{r} 0 \\ -6 \end{array}$$~~

6. Solve the following system: 
$$\begin{cases} y = -x - 5 \\ y = x^2 - 12x + 28 \end{cases}$$

$$\begin{array}{r} -x - 5 = x^2 - 12x + 28 \\ \cancel{+x} \quad \cancel{+5} \qquad \qquad \quad +x \quad +5 \end{array}$$

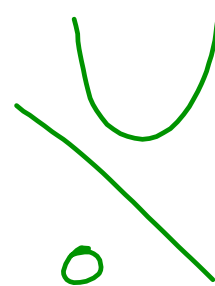
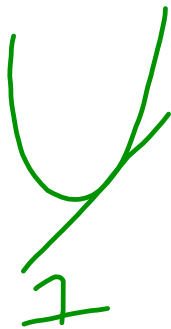
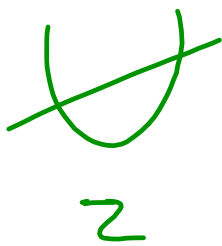
$$0 = x - 11x + 33$$

No solution

$$\begin{array}{r} 33 \\ \times \\ -11 \end{array}$$

-3, -11 = -14  
DOESN'T EVEN  
COME CLOSE...

7. How many points of intersection are possible between a line and a parabola?  
Sketch examples of all possible answers.



8. Solve. Write your answer in interval notation.

$$\cancel{-4} - 3x > 5 \text{ or } 16 - x \leq 7 - \cancel{16}$$

$$\cancel{-3}x > 9 \quad | \quad \cancel{-1}x \leq \cancel{+9}$$

$$x < -3 \quad x \geq 9$$

$$(-\infty, -3) \cup [9, \infty)$$

9. Solve. Write your answer in interval notation.

$$21 < 2x + 13 \leq 35$$

$$\frac{8}{2} < \frac{2x}{2} \leq \frac{22}{2}$$

$$4 < x \leq 11$$

$$(4, 11]$$

10. Solve. Write your answer in interval notation.

$$2x < 5x + 21$$

$$\begin{array}{r} -5x - 5x \\ -3x < 21 \\ \hline -3 \end{array}$$

$$x > -7$$

$$\boxed{(-7, \infty)}$$

11. Compare the maximums of the following quadratic functions. Sort from least to greatest.

A.  $f(x) = -(x+2)^2 + 3$

$$(-2, 3)$$

B.  $g(x) = -x^2 + 4x$

$$(2, 4)$$

C.  $h(x) = -2(x+5)^2 - 7$

$$(-5, -7)$$

D.  $j(x) = -x^2 - 12x - 40$

$$(-6, -4)$$

$$h(x), j(x), f(x), g(x)$$

$$C, D, A, B$$

12. Compare slopes of the following linear functions. Sort from least to greatest.

A.  $y = 14 - x$   $m = -1$

C.  $y = -5x + 7$   $m = -5$

B.  $10x + 4y = 3$   $-10x$   $4y = -10x + 3$

D.  $x - 2y = 2 - x$

$-x$   
 $-2y = -x + 2$   
 $\frac{-2y}{-2} = \frac{-x + 2}{-2}$

$y = \frac{1}{2}x - 1$   $m = \frac{1}{2}$

$y = \frac{-10}{4}x + \frac{3}{4}$

$m = \frac{-10}{4}$

c, b, a, d

13. If  $f(x) = 5x^2 + 11x + 8$  and  $g(x) = 6x - 2$ , then  $f(x) - g(x) =$  \_\_\_\_\_.

$$5x^2 + 11x + 8 - (6x - 2)$$

$$5x^2 + \underline{11x} + \underline{8} - \underline{6x} + \underline{2}$$

$$\boxed{5x^2 + \underline{5x} + \underline{10}}$$



14. Write a formula for the area of the rectangle shown below in terms of  $x$ .

$x-5 = h$        $(2x+3)(x-5)$   
 $b = 2x+3$

	$2x$	$+3$	
$\times$	$2x^2$	$3x$	$2x^2 - 7x - 15$
$-5$	$-10x$	$-15$	

15. The cost in dollars for a company to produce each item it sells is given by,  $C(x) = 3x^2 - 72x + 450$ , where  $x$  is the number of units. The revenue per item is given by  $R(x) = 30$ . If profit,  $P(x)$ , is revenue minus cost, or  $P(x) = R(x) - C(x)$ , find the profit function  $P(x)$ .

$$P(x) = 30 - (3x^2 - 72x + 450)$$

16. Find the cost, revenue, and profit per item if the company produces 11 units.

$$C(11) = 3(11)^2 - 72(11) + 450 = \textcircled{21}$$

$$R(11) = \textcircled{30}$$

$$P(11) = 30 - 21 = \textcircled{9}$$