

Exam Review Guide #2

1) Identify the vertex of the following parabolas:

a) $y = (x+3)^2 - 4$

b) $y = (x-7)^2 + 2$

$$V = (-3, -4)$$

$$V = (7, 2)$$

2) Convert the following parabolas to vertex form.

a) $y = x^2 + 8x - 13$

b) $y = x^2 - 6x + 7$

$$x^2 + 8x + 16 - 16 - 13$$

$$y = x^2 - 6x + 9 - 9 + 7$$

$$y = (x+4)^2 - 29$$

$$y = (x-3)^2 - 2$$

3) Shift the parabolas:

a) $y = (x-5)^2 + 3$

3 units left, 2 units up

$$V = (5, 3) \rightarrow \text{new } V = (5-3, 3+2)$$

$$V = (2, 5)$$

$$y = (x-2)^2 + 5$$

b) $y = (x+3)^2 - 5$

5 units right, 4 units down

$$V = (-3, -5) \rightarrow \text{new } V = (-3+5, -5-4)$$

$$\text{new } V = (2, -9)$$

$$y = (x-2)^2 - 9$$

4) Find the sum and the product of the roots:

a) $y = x^2 - 6x + 13$

$$\text{sum} = -\frac{b}{a} = -\frac{(-6)}{1} = 6$$

$$\text{product} = \frac{c}{a} = \frac{13}{1} = 13$$

b) $y = 2x^2 - x - 15$

$$\text{sum} = -\frac{b}{a} = -\frac{(-1)}{2} = \frac{1}{2}$$

$$\text{product} = \frac{c}{a} = \frac{-15}{2} = -7.5$$

either

5) If $y = x^2 + mx - 15$ & $x_1 = 3$, find x_2 and m .

$$\text{product is } -15 \quad x_1 \cdot x_2 = -15$$

$$\text{sum} = 3 + x_2 = -2$$

$$3 \cdot x_2 = -15$$

$$m = +2$$

$$x_2 = -5$$

Name:

6) If $y = x^2 - 4x + k$ and $x_1 = 9$, find x_2 and k .

$$\text{sum} = +4 \rightarrow x_1 + x_2 = 4 \rightarrow 9 + x_2 = 4$$

$$x_2 = -5$$

$$\text{product} = (-5)(9) = -45$$

$$k = -45$$

7) If the roots of a quadratic equation are $3 + \sqrt{5}$ and $3 - \sqrt{5}$, what is the equation?

$$\text{sum} = (3 + \sqrt{5}) + (3 - \sqrt{5}) = 6$$

$$\text{product} = (3 + \sqrt{5})(3 - \sqrt{5})$$

$$9 - 3\sqrt{5} + 3\sqrt{5} - 5 = 4$$

negate

$$\text{equation: } x^2 - 6x + 4 = 0$$

8) Solve the following equation using completing the square.

$$0 = x^2 - 8x + 20$$

$$x^2 - 8x + 16 - 16 + 20 = 0$$

$$(x-4)^2 + 4 = 0$$

$$\sqrt{(x-4)^2} = \sqrt{-4}$$

$$x-4 = \pm 2i$$

$$+4 \quad +4$$

$$x = 4 \pm 2i$$

9) Solve by factoring: $x^2 - 5x - 36 = 0$

$$(x-9)(x+4) = 0$$

$$x = 9$$

$$x = -4$$