

Algebra 2 Chapter 5 Pre-Test

1.) (5 pts total, 2.5 pts each) Rewrite each function in standard form. Indicate whether the function is a quadratic.

a)  $(x - 7)(x - 7)$

b)  $2(x + 2)^2 - 2x^2$

$$2(x+2)^2 - 2x^2$$

$$2(x+2)(x+2) - 2x^2$$

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

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

2.) (5 pts) Find a quadratic model for the following set of values:

$(-4, 8), (-1, 5), (1, 13)$

$$1f \quad (0, 2)$$

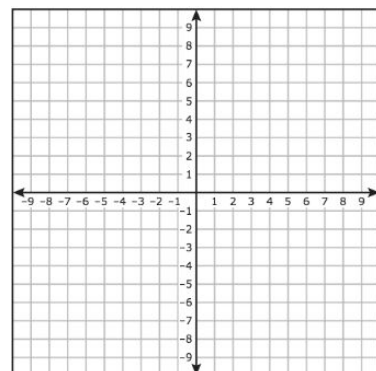
$$x=0 \quad y=2$$

$$y\text{-int}=2$$

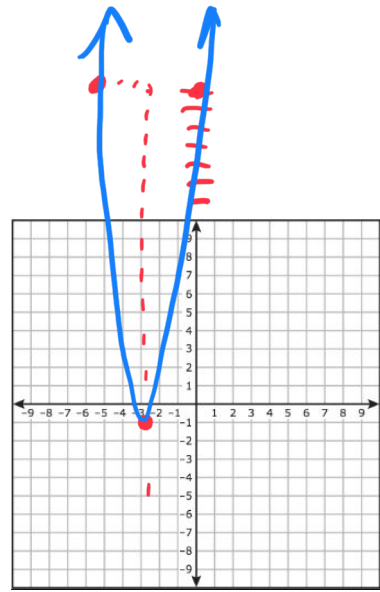
$$c=2$$

3.) (10 pts total, 5 pts each) Graph each parabola. Label the vertex and axis of symmetry.

a)  $x^2 - 4x + 10$



b)  $2x^2 + 12x + 17$



4.) (20 pts total, 5 pts each) Factor each expression.

a)  $x^2 + 5x - 14$

b)  $x^2 + 7x + 12$

c)  $2x^2 - 13x + 15$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Factor**

d)  $3x^2 - 5x - 12$

Zeros:  $3$     $-\frac{4}{3}$

$x = 3$     $x = -\frac{4}{3}$   
 $-3 \quad -3$     $+\frac{4}{3} \quad +\frac{4}{3}$   
 $x - 3 = 0$     $x + \frac{4}{3} = 0$

$3(x-3)(x+\frac{4}{3})$     $(x-3)(3x+4)$

$$\frac{5 \pm \sqrt{25 + 144}}{2(3)}$$

$$\frac{5 \pm \sqrt{169}}{6} = \frac{5 \pm 13}{6}$$

$\frac{5+13}{6} = \frac{18}{6} = 3$     $\frac{5-13}{6} = \frac{-8}{6} = -\frac{4}{3}$

5.) (10 pts total, 2.5 pts each) Evaluate the discriminant of the equation. Indicate the number of real roots for each.

a)  $x^2 - 4x + 4$

$a = 1$   
 $b = -4$   
 $c = 4$

$$b^2 - 4ac$$

$$(-4)^2 - 4(1)(4)$$

$$16 - 16 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

discriminant

**1 real root**

b)  $-2x^2 + 6x - 14$

$a = -2$   
 $b = 6$   
 $c = -14$

$$b^2 - 4ac$$

$$(6)^2 - 4(-2)(-14)$$

$$36 - 112 = -76$$

**$\emptyset$  real roots**

c)  $x^2 + 9x + 18$

d)  $2x^2 + 11x - 21$

6.) (15 pts total, 7.5 pts each) Solve using the Quadratic Equation.

a)  $x^2 = 3x + 2$

Trying to find zeros where  $y = 0$

b)  $3x^2 - 5x = -12$   
 $+12 +12$   
 $3x^2 - 5x + 12 = 0$

$a = 3$   
 $b = -5$   
 $c = 12$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(12)}}{2(3)}$$
$$\frac{5 \pm \sqrt{25 - 144}}{6} = \frac{5 \pm \sqrt{-119}}{6} \quad \sqrt{-1} = i$$

7.) (15 pts total, 7.5 pts each) Place each equation in vertex form by completing the square. Please show all your work.

a)  $x^2 = 5x + 14$

$$\frac{5 \pm i\sqrt{119}}{6}$$



Complete the square to find vertex form

b)  $2x^2 + 6x - 7 = 0$

$(2x^2 + \frac{6x}{2}) - 7 = 0$

$2(x^2 + 3x) - 7 = 0$

$(\frac{3}{2})^2 + \frac{9}{4} - \frac{9}{4}(2)$

$2(x^2 + 3x + \frac{9}{4}) - 7 - \frac{9}{2}$

$-7 - \frac{9}{2}$

$-\frac{14}{2} - \frac{9}{2} = -\frac{23}{2}$

$2(x + \frac{3}{2})^2 - \frac{23}{2}$

1.) zero it

2.) factor out a

3.)  $(\frac{b}{2})^2$  add in sub out

4.) Square root 1st & last

vertex:  $(-\frac{3}{2}, -\frac{23}{2})$

8.) (20 pts total, 10 pts each) Graph each equation completely. Plot all roots, intercepts, and the vertex.

a)  $x^2 - 4x - 5$  y-int

Scenario #1

zeros  $\rightarrow$  vertex

$h = \text{Average of zeros}$

$\frac{5 + (-1)}{2} = \frac{4}{2} = 2$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$2a$

$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-5)}}{2(1)}$

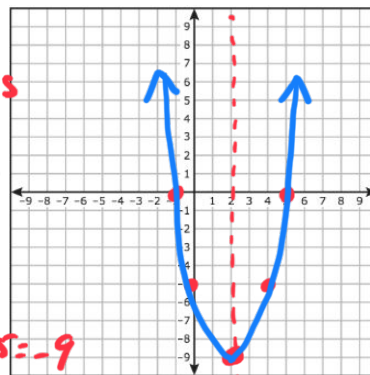
$(2)^2 - 4(2) - 5$

$4 - 8 - 5 = -4 - 5 = -9$

$\frac{4 \pm \sqrt{16 + 20}}{2}$

$\frac{4 \pm \sqrt{36}}{2} = \frac{4 \pm 6}{2}$

$\frac{4+6}{2} = 5$   $\frac{4-6}{2} = -1$



b)  $x^2 - 4x - 5$

Scenario #2

vertex  $\rightarrow$  zeros  $(\frac{-4}{2})^2 + 4 - 4$

$(x^2 - 4x + 4) - 9$

$\sqrt{x^2}$

$(x-2)^2 - 9$

vertex:  $(2, -9)$

$x = 2 + 3 = 5$   
 $2 - 3 = -1$

$(x-2)^2 - 9 = 0$   
 $+9 +9$   
 $\sqrt{(x-2)^2 - 9}$

$x - 2 = \pm 3$   
 $+2 +2$

