

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

x^2 × constant

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

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

$(-4, 8), (-1, 5), (1, 13)$
 $x = -4, y = 8$

$ax^2 + bx + c = y$
 $a(-4)^2 + b(-4) + c = 8$
 $16a - 4b + c = 8$

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

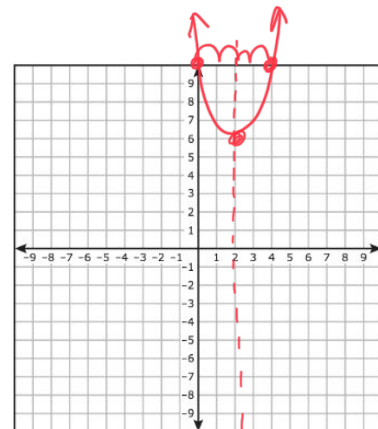
a) $x^2 - 4x + 10$ ← y-int $a=1$
 $b=-4$
 $c=10$

2 ways to Find Vertex

→ 1.) $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right) - \left(\frac{-(-4)}{2(1)}\right) = -(-2) = 2$

$x=2$ $f(2) = (2)^2 - 4(2) + 10$ $(2, 6)$
 $4 - 8 + 10$

$-4 + 10 = 6$ axis of symmetry: $x=2$



2.) Complete the Square
 ↳ vertex formula

$$\left(\frac{-4}{2}\right)^2$$

$$(-2)^2 = 4$$

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

\uparrow \uparrow
 $+4$ -4

1.) 2020 it

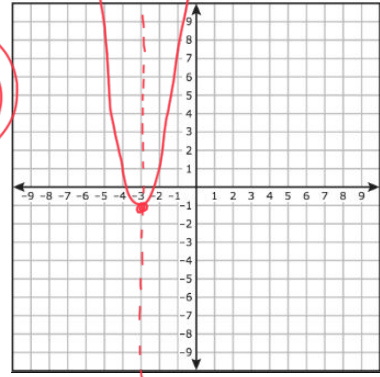
2.) Factor out "a"

3.) $\left(\frac{10}{2}\right)^2$

$$(x^2 - 4x + 4) + 6$$

$$(x - 2)^2 + 6$$

Vertex $(2, 6)$



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

Complete the Square

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

$$\left(\frac{6}{2}\right)^2$$

$$(3)^2 = 9$$

$$2(x^2 + 6x) + 17$$

\uparrow \uparrow
 $+9$ $-9(2)$

$$2(x^2 + 6x + 9) + 17 - 18$$

$$2(x + 3)^2 - 1$$

$$2(x^2 + 6x + 9) - 1$$

$$\sqrt{x^2} \downarrow \quad \downarrow \quad \downarrow \sqrt{9}$$

$$2(x + 3)^2 - 1$$

Vertex: $(-3, -1)$

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

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

$$(x - 2)(x + 7)$$

$$-2 * 7 = -14$$

$$-2 + 7 = 5$$

line of symmetry $x = -3$

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

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

\ominus
 same signs

	$2x - 3$	
x	$2x^2$	$-3x$
-5	$-10x$	15

$$-10x + (-3x) = -13x$$

$$\frac{2x^2}{2x \cdot x} \quad \frac{+15}{1 \ 15}$$

$$3 \ 5$$

$$(2x - 3)(x - 5)$$

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

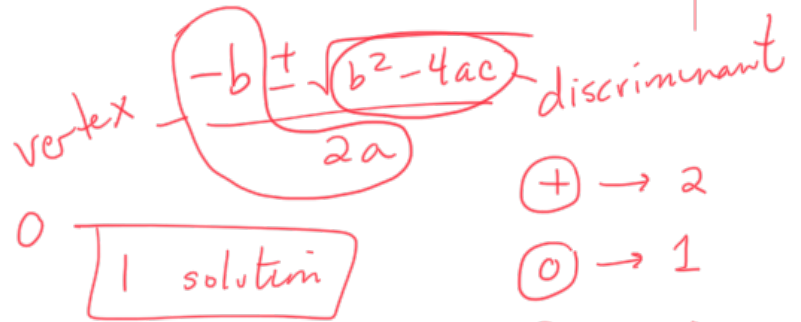
5.) (10 pts total, 2.5 pts each) Evaluate the discriminant of the equation. Indicate the number of real roots for each.

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

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

$b^2 - 4ac$

$(-4)^2 - 4(1)(4) \quad 16 - 16 = 0$



$\oplus \rightarrow 2$

$\circ \rightarrow 1$

$\ominus \rightarrow 0$

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

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

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

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

$$a = 1$$

$$b = -3$$

$$c = -2$$

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

$$-3x \quad -3x \quad -2$$

$$-2$$

$$x^2 - 3x - 2 = 0$$

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

$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$$

$$\frac{3 \pm \sqrt{9 + 8}}{2} = \boxed{\frac{3 \pm \sqrt{17}}{2}}$$

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

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

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

$$-5x \quad -5x \quad -14$$

$$-14$$

$$(x^2 - 5x) - 14 = 0$$

$$+ \frac{25}{4} \quad - \frac{25}{4}$$

$$\left(x^2 - 5x + \frac{25}{4}\right) - 14 - \frac{25}{4}$$

$$\left(x - \frac{5}{2}\right)^2 - \frac{81}{4}$$

$$\left(\frac{-5}{2}\right)^2 = \frac{25}{4}$$

$$-14 = \frac{-56}{4}$$

$$\frac{-56}{4} - \frac{25}{4} = \frac{-81}{4}$$

$$\boxed{\left(x - \frac{5}{2}\right)^2 - \frac{81}{4}}$$

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

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

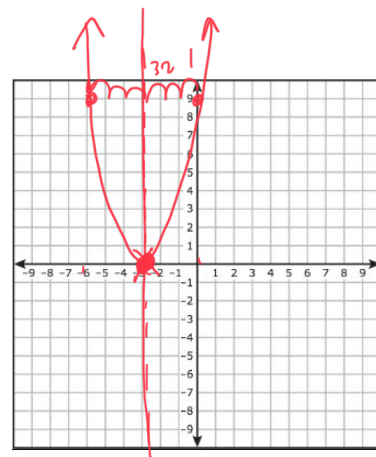
a) $x^2 + 6x + 9$
 vertex
 roots
 y-int.

$$-\frac{b}{2a} = \frac{-6}{2(1)} = -3$$

$$(-3)^2 + 6(-3) + 9$$

$$9 - 18 + 9 = 0$$

$$(-3, 0)$$



$$(x+3)(x+3) = 0$$

$$\frac{3}{3} * \frac{3}{3} = 9$$

$$\frac{3}{3} + \frac{3}{3} = 6$$

$$x+3=0$$

$$-3$$

$$x+3=0$$

$$-3 -3$$

$$x = -3$$

HW
 Pre-test
 optimal Ch 5
 review

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

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

$$\frac{-5}{1} * \frac{1}{1} = -5$$

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

$$\frac{-(-4)}{2(1)}$$

$$\frac{4}{2} = 2$$

$$(x-5)(x+1) = 0$$

$$x-5=0$$

$$+5 +5$$

$$x=5$$

$$x+1=0$$

$$-1 -1$$

$$x=-1$$

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

$$4 - 8 - 5$$

$$-4 - 5 = -9$$

$$(2, -9)$$

No HW/Q
 27

Actual
 Test

due
 April
 29th

