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 ← the highest degreed term.

Exponents must be whole numbers (no fractions, decimals, negatives)

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

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

1 2 3

x y

$y = ax^2 + bx + c$

$8 = a(-4)^2 + b(-4) + c$

$8 = 16a - 4b + c$

↑ ↑ ↑

↑ y = —

x = —

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

a) $x^2 - 4x + 10$ ← y-int

(2, 6)

Vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

Completing the Square

$a = 1$

$b = -4$

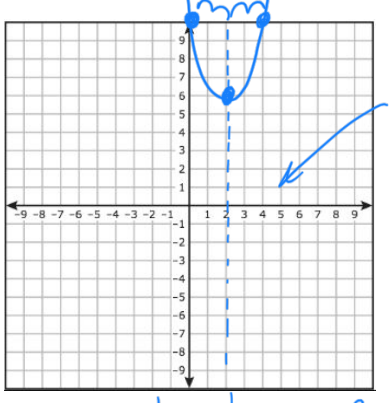
$c = 10$

x coordinate for vertex: $\frac{-(-4)}{2(1)} = \frac{4}{2} = 2$

$f(2): (2)^2 - 4(2) + 10$

$4 - 8 + 10$

$-4 + 10 = 6$



= 2

∅ roots

discriminant

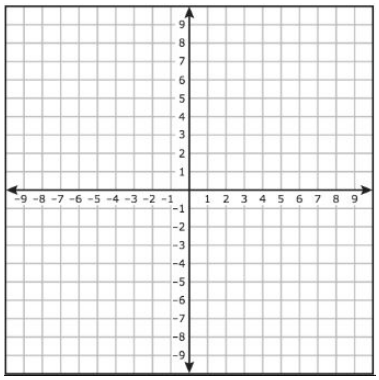
$b^2 - 4ac$

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

$(-4)^2 - 4(1)(10)$

$16 - 40 = -24$

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



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

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

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

$(-2)(7) = -14$

$-2 + 7 = +5$

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

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

$2x^2$

$2x \cdot 1x$

15

$1 \cdot 15$

$3 \cdot 5$

$2x - 15$

	$2x^2$	$-15x$
x		
-1	$-2x$	15

$-2x - 15x = -17x$

$-31x$

$2x - 1$

	$2x^2$	$-x$
x		
-15	$-30x$	$+15$

$2x - 3$

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

$-10x - 3x = -13x$

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

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) $x^2 - 4x + 4$

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

b^2-4ac

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

$16-16=0$

1 root

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

#roots

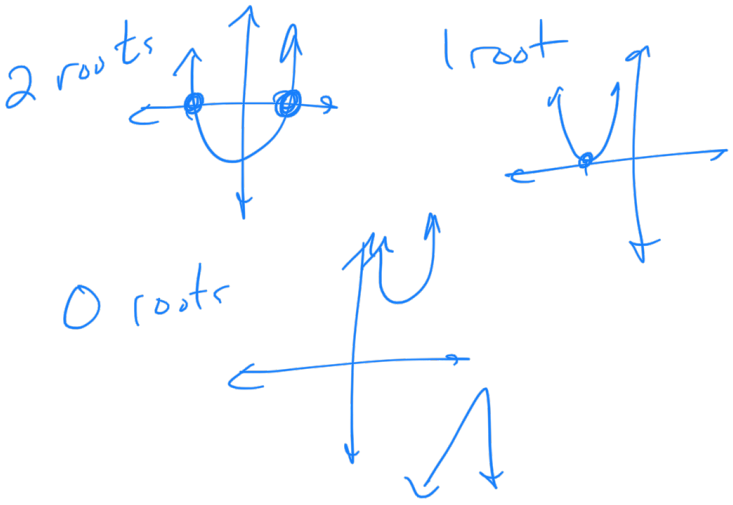
+ disc > 0 → 2

disc = 0 → 1

disc < 0 → 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) $x^2 = 3x + 2$

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

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

$a = 1$, $b = -3$, $c = -2$

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

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

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

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) $x^2 = 5x + 14$

Complete the Square

1.) 2020 it!

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

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

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

2.) factor out the a term.

$\frac{25}{2}$ $\quad -\frac{25}{2}$

3.) $\left(\frac{b}{2}\right)^2 \left(-\frac{5}{2}\right)^2$

$+\frac{25}{4}$

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

$\left(x^2 - 5x + \frac{25}{4}\right) - \frac{81}{4}$

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

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

4.) Square Root it

Vertex: $\left(\frac{5}{2}, -\frac{81}{4}\right)$

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

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) $x^2 + 6x + 9$

quadratic form / factoring

y-int = c term

x-int

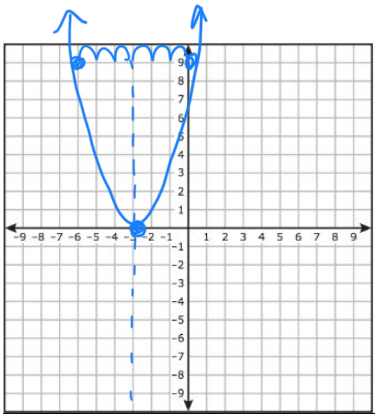
$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ or complete the square

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

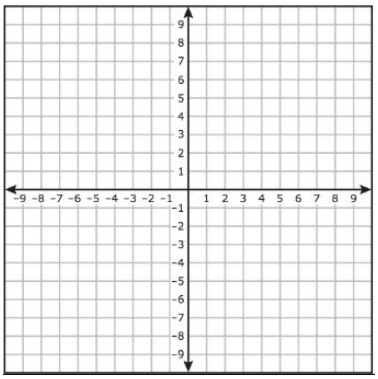
vertex $(-3, 0)$

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

$9 - 18 + 9 = 0$



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



HW

Optional HW 28

Ch 5 Review

Ch 5 Pre-Test

Actual Test (May 5th)

HW/26 April 23rd

HW/27 April 30th