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

1.) Highest exponent is x^2

2.) All exponents must be whole numbers — No negatives, fractions/decimals

$x^2 - 7x - 7x + 49$

$x^2 - 14x + 49$ yay!

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

Quadratic Model $Ax^2 + Bx + C = y$

(-4,8) $y = Ax^2 + Bx + C$ $8 = 16A - 4B + C$

$f(-4) = 8$ $8 = A(-4)^2 + B(-4) + C$

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

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

$8 = 16A - 4B + C$

(-1,5) $5 = A(-1)^2 + B(-1) + C$

$5 = A - B + C$

(1,13) $13 = A(1)^2 + B(1) + C$

$13 = A + B + C$

$\begin{cases} 5 = A - B + C \\ 13 = A + B + C \end{cases}$

$-1(5 = A - B + C)$

$13 = A + B + C$

$-5 = -A + B - C$

$13 = A + B + C$

$8 = 2B$

$\frac{8}{2} = \frac{2B}{2}$

$B = 4$

$8 = 16A - 4(4) + C$

$8 = 16A - 16 + C$

$+16 \quad +16$

$24 = 16A + C$

$5 = A - 4 + C$

$+4 \quad +4$

$9 = A + C$

$24 = 16A + C$

$-1(9 = A + C)$

$24 = 16A + C$

$-9 = -A - C$

$15 = 15A$

$A = 1$

$y = Ax^2 + Bx + C$

$y = x^2 + 4x + 8$

$13 = A + B + C$

$13 = 1 + 4 + C$

$13 = 5 + C$

$-5 \quad -5$

$8 = C$

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

a) $x^2 - 4x + 10$ ← y-int

Vertex

Vertex: (h, k)

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

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

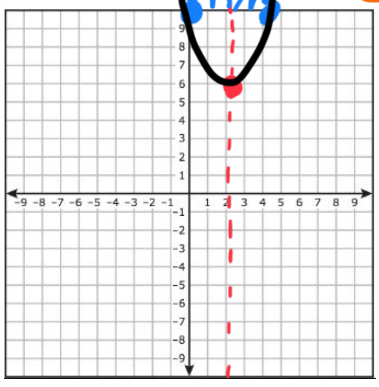
$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x^2 - 4x + 10$

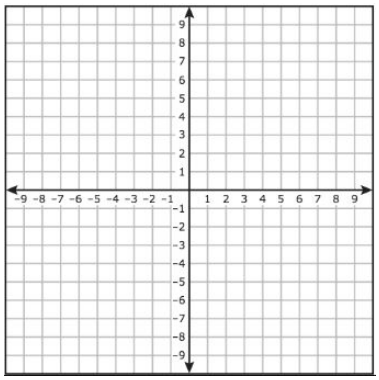
$(2)^2 - 4(2) + 10$

$4 - 8 + 10 = -4 + 10 = 6$

(2,6)



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



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

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

$7 * -2 = -14$

$7 + -2 = 5$

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

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

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

0 | 15 [1·15] 3·5 | 2 [2·1]

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

same

1)

X	2x	-1
2x	$2x^2$	-x
-15	-30x	+15

$-30x - x = -31x$

X	2x	-15
2x	$2x^2$	-15x
-1	-2x	+15

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

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

$-10x - 3x = -13x$ ✓

$a=2$ $b=-13$ $c=15$

$2x^2-13x+15$ Factor

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

$\frac{-(-13)\pm\sqrt{(-13)^2-4(2)(15)}}{2(2)}$

$\frac{13\pm\sqrt{169-120}}{4}=\frac{13\pm\sqrt{49}}{4}$

$\frac{13+7}{4}$ $\frac{13-7}{4}$

$\frac{20}{4}$ $\frac{6}{4}$

5 $\frac{3}{2}$

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

$x=5$ $x=\frac{3}{2}$

$-5\ -5$ $-\frac{3}{2}\ -\frac{3}{2}$

$x-5=0$ $x-\frac{3}{2}=0$

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

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

$2(x-5)(x-\frac{3}{2})$

$2(x-\frac{3}{2})$ $(2x-3)(x-5)$

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) $x^2 = 3x + 2$

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

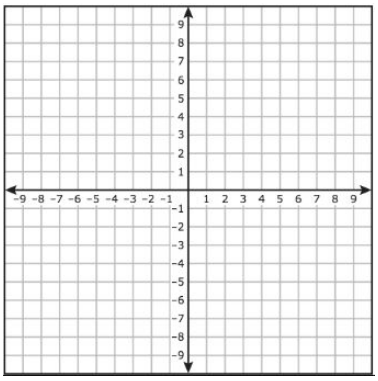
7.) (15 pts total, 7.5 pts each) Place each equation in vertex form by completing the square. Please show all your work.

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

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

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

a) $x^2 + 6x + 9$



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