

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) $(x - 7)(x - 7)$ FOIL
 $x^2 - 7x - 7x + 49$
 $x^2 - 14x + 49$ yes!

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

1.) Highest degree term is x^2

2.) All exponents must be whole numbers — no fractions or negative

$$\begin{cases} 16a - 4b + c = 8 \\ a + b + c = 13 \end{cases} \quad \begin{cases} 16a - 4b + c = 8 \\ -a - b - c = -13 \end{cases}$$

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

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

$ax^2 + bx + c = y$

① $16a - 4b + c = 8$
 ② $a - b + c = 5$
 ③ $a + b + c = 13$

$15a - 5b = -5$
 $15a - 5(4) = -5$
 $15a - 20 = -5$
 $+20 +20$
 $15a = 15$
 $\frac{15a}{15} = \frac{15}{15}$
 $a = 1$

$a + b + c = 13$
 $1 + 4 + c = 13$
 $5 + c = 13$
 $-5 -5$
 $c = 8$

$2b = 8$
 $\frac{2b}{2} = \frac{8}{2}$
 $b = 4$

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

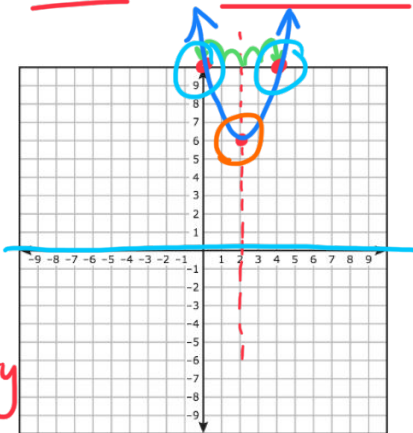
3.) (10 pts total, 5 pts each) Graph each parabola. Label the vertex and axis of symmetry.

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

① $h = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$ h, k

② $y = x^2 - 4x + 10$ ③ Vertex: $(2, 6)$ line of symmetry

$y = (2)^2 - 4(2) + 10$
 $4 - 8 + 10 = 6$
 $-4 + 10 = 6$ $X = h$ $X = 2$



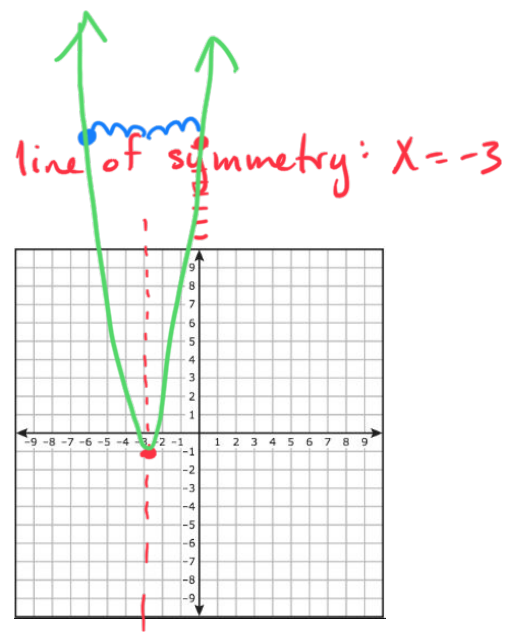
- Find vertex (h,k)
- graph using line of symmetry

b) $2x^2 + 12x + 17$ ← y-int
 $a=2$ $b=12$ $c=17$

$-\frac{b}{2a} = \frac{-12}{2(2)} = \frac{-12}{4} = -3 = h$

vertex: $(-3, -1)$

$2(-3)^2 + 12(-3) + 17$
 $2(9) + 12(-3) + 17$
 $18 + (-36) + 17$
 $-18 + 17 = -1$



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

Bigger one is +

a) $x^2 + 5x - 14$ numbers have different signs

$7 * -2 = -14$
 $7 + -2 = 5$

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

b) $x^2 + 7x + 12 = 0$

QF -7, 2

$x = -7$ $x = 2$
 $+7 +7$ $-2 -2$

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

$3 * 4 = 12$
 $3 + 4 = 7$ $(x+3)(x+4)$

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

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

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

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

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

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

$\frac{13 \pm 7}{4}$ $\frac{13+7}{4} = \frac{20}{4} = 5$ $\frac{13-7}{4} = \frac{6}{4} = \frac{3}{2}$

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

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) $x^2 - 4x + 4$

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

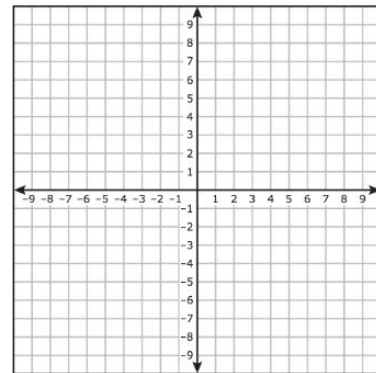
7.) (15 pts total, 7.5 pts each) Place each equation in vertex form by completing the square.
Please show all your work.

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

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

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

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



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

