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

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

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

1.) Highest exponent is x^2

2.) All exponents must be whole numbers – No fractions or negatives!

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

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

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

$y = Ax^2 + Bx + C$

$Ax^2 + Bx + C = y$

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

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

① $16A - 4B + C = 8$

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

② $A - B + C = 5$

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

③ $A + B + C = 13$

① $16A - 4B + C = 8$

② $A - B + C = 5$

③ $A + B + C = 13$

① $16A - 4(4) + C = 8$

$16A - 16 + C = 8$

$+16 \quad +16$

$16A + C = 24$

② $A - 4 + C = 5$

$A + C = 9$

$-4 \quad -4$

$-1(A + C = 9)$

$16A + C = 24$

$+ \; -A - C = -9$

$15A = 15$

$15 \quad 15$

$A = 1$

② $A - B + C = 5$

③ $-(A + B + C = 13)$

$-B - B = -13$

$-2B = -8$

$-2 \quad -2$

$B = 4$

$A + B + C = 13$

$1 + 4 + C = 13$

$5 + C = 13$

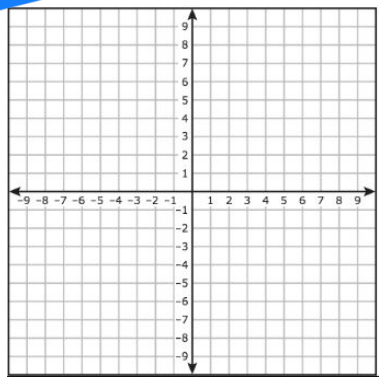
$-5 \quad -5$

$C = 8$

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

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

Hinting at y-int



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

Graph → vertex, y-int

line of symmetry = h $x = -3$

vertex $(-3, -1)$

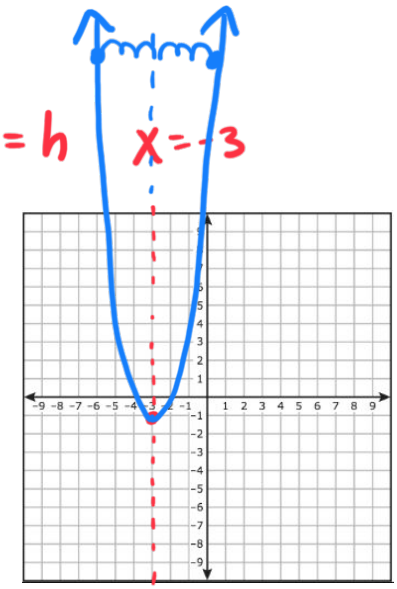
$h = \frac{-b}{2a}$ $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

$k = 2(-3)^2 + 12(-3) + 17$

$2(9) - 36 + 17$

$18 - 36 + 17 = -18 + 17 = -1$



vertex form: $y = a(x-h)^2 + k$

$2(x+3)^2 - 1 = 0$

$+1 \quad +1$

$\frac{2(x+3)^2}{2} = \frac{1}{2}$

$\sqrt{(x+3)^2} = \sqrt{\frac{1}{2}}$

$x + 3 = \pm\sqrt{\frac{1}{2}}$

$-3 \quad -3$

$x = -3 \pm \sqrt{\frac{1}{2}}$

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

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

largest sign

$7 * -2 = -14$ different signs

$7 + -2 = 5$

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

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

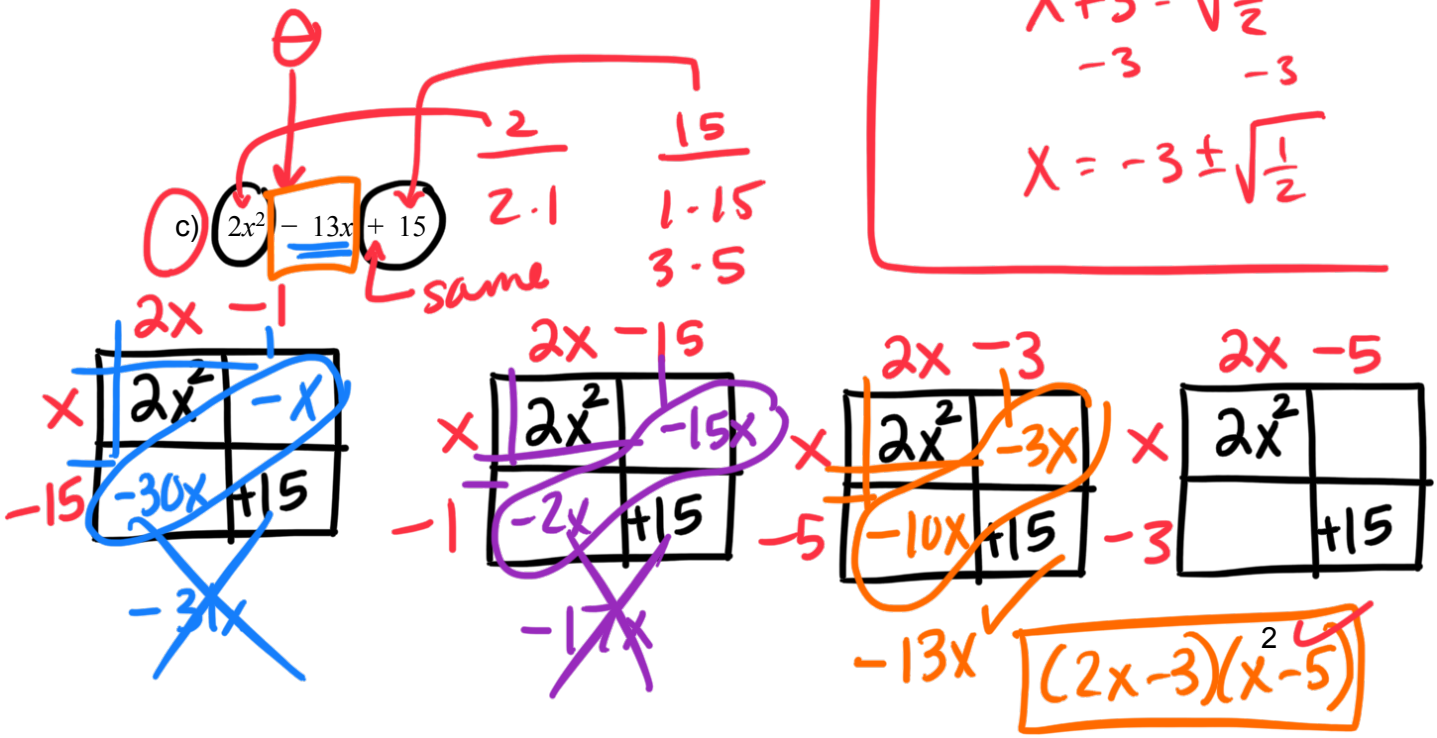
c) $2x^2 - 13x + 15$

$2 \quad 15$

$2 \cdot 1 \quad 1 \cdot 15$

$3 \cdot 5$

same



if quadratic

$2x^2 - 13x + 15$ $2\left(x - \frac{3}{2}\right) = 0$

$2x - 3 = 0$

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

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

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

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

$(x-5) = 0 \quad \left(x - \frac{3}{2}\right) = 0$

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

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

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

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

$\frac{13 \pm 7}{4}$

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

$\frac{26}{4} = 5 \quad \frac{6}{4} = \frac{3}{2}$

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.

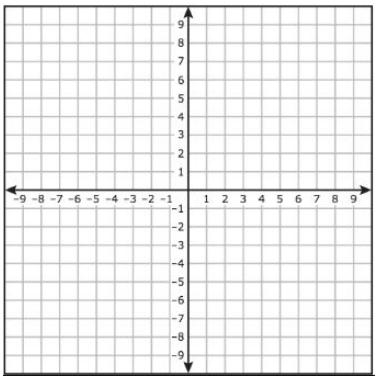
a) $x^2 = 5x + 14$

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

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

x's ? y's

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



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