

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

$x^2 - 7x - 7x + 49$
 $[x^2 - 14x + 49]$

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

1.) Highest exponent is x^2

2.) All exponents must be whole numbers - No negatives or fraction/decimals

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

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

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

$y = Ax^2 + Bx + C$
 $5 = A - B + C$
 $13 = A + B + C$

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

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

$-5 = A + B - C$
 $13 = A + B + C$

① $8 = 16A - 4B + C$

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$\frac{8}{2} = \frac{2B}{2}$ $[B = 4]$

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

② $5 = A - B + C$

① $8 = 16A - 4(4) + C$

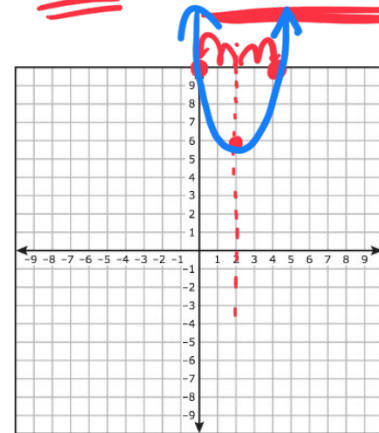
$(1, 13)$
 ② $5 = A - B + C$

③ $13 = A + B + C$

$8 = 16A - 16 + C$
 $+16$
 $+16$

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

a) $x^2 - 4x + 10$
 $13 = A + B + C$
 $13 = 1 + 4 + C$
 $13 = 5 + C$
 $-5 - 5$
 $[C = 8]$
 vertex: (h, k)
 $h = \frac{-b}{2a} = \frac{-(-4)}{2(1)}$
 $\frac{4}{2} = 2 = h$
 $k = (2)^2 - 4(2) + 10$
 $4 - 8 + 10$
 $-4 + 10 = 6$
 Vertex: $(2, 6)$
 $-\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$



③ $13 = A + 4 + C$
 $-4 - 4$

$9 = A + C$

$24 = 16A + C$

$9 = A + C$

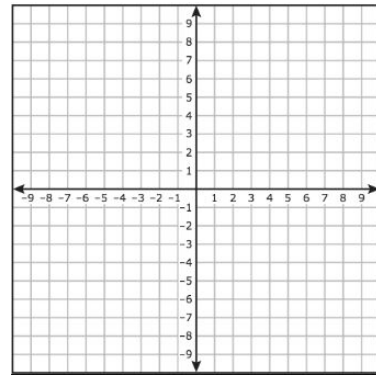
$24 = 16A + C$

$9 = -A + C$

$[A = 1]$
 $\frac{15}{15} = \frac{15A}{15}$

axis of symmetry $x = h$
 $x = 2$

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



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

Big \oplus \ominus different signs

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

$\underline{7} * \underline{-2} = -14$
 $\underline{7} + \underline{-2} = 5$

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

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

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

$\frac{2}{2 \cdot 1}$ $\frac{15}{1 \cdot 15}$
 $\frac{15}{3 \cdot 5}$

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

$2x \quad -1$

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

$-30x + (-x)$
 ~~$-31x$~~

$2x \quad -15$

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

$-15x + (-2x)$
 ~~$-17x$~~

$2x \quad -3$

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

$-10x + (-3x)$
 $-13x$ ✓

$2x \quad -5$

x	$2x^2$	
-3		15

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

Quadratic formula

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

\downarrow
~~d) $3x^2 - 5x - 12$~~
 $a=2 \quad b=-13 \quad c=15$

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

$x=5$
 $-5 \quad -5$
 $x-5=0$

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

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

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

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

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

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

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

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

$$\frac{13 \pm \sqrt{49}}{4} = \frac{13 \pm 7}{4}$$

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

$$\frac{13+7}{4} = \frac{20}{4} = 5$$

$$\frac{13-7}{4} = \frac{6}{4} = \frac{3}{2}$$

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

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

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

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

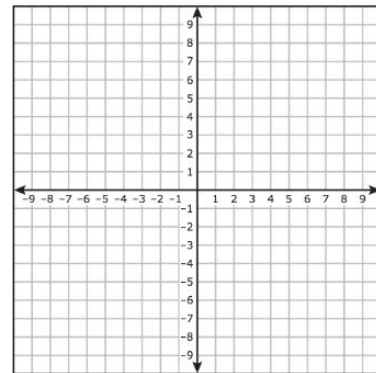
7.) (15 pts total, 7.5 pts each) Place each equation in vertex form by completing the square.
Please show all your work.

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) $x^2 - 4x - 5$

