

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

input $(-4, 8)$, $(-1, 5)$, $(1, 13)$ *output*

$y = ax^2 + bx + c$

$x = -4 \quad y = 8$ $x = -1 \quad y = 5$

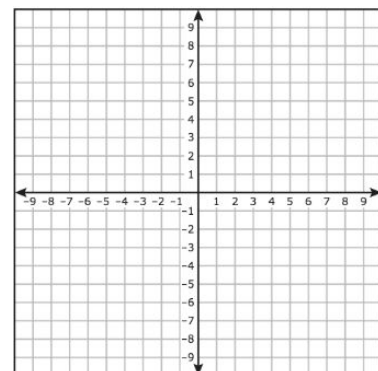
$8 = a(-4)^2 + b(-4) + c$ $5 = a(-1)^2 + b(-1) + c$

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

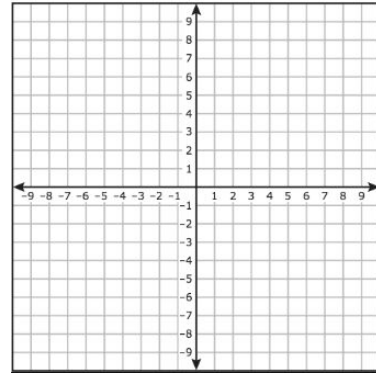
③ $13 = a + b + c$

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

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



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



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

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

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

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

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.

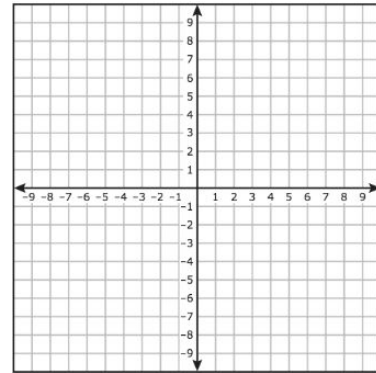
a) ~~$x^2 - 5x + 14$~~ $2x^2 = 4x + 14$ 1.) zero it
 $-14 - 4x - 4x - 14$ 2.) factor out a
 $(2x^2 - 4x) - 14 = 0$ 3.) $(\frac{b}{2})^2$

$(\frac{b}{2})^2$ $2(x^2 - 2x) - 14 = 0$ $2(x^2 - 2x + 1) - 14 - 2$
 $(-\frac{2}{2})^2 = 1$ \uparrow \uparrow \uparrow $2(x^2 - 2x + 1) - 16$
 $+1$ $-1(2)$ $\sqrt{x^2} \downarrow$ \downarrow $\sqrt{1}$
 vertex: $(1, -16)$ $2(x-1)^2 - 16$

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) $x^2 + 6x + 9$



$$x - 2 = \pm 3$$

$$\begin{array}{l} \swarrow \\ x - 2 = 3 \\ \quad +2 \quad +2 \\ x = 5 \end{array} \qquad \begin{array}{l} \searrow \\ x - 2 = -3 \\ \quad +2 \quad +2 \\ x = -1 \end{array}$$

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

Complete the square

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

$$\begin{array}{c} \uparrow \qquad \uparrow \\ (-\frac{4}{2})^2 \quad +4 \quad -4 \end{array}$$

$$(x^2 - 4x + 4) - 9$$

$$\begin{array}{c} \sqrt{x^2} \quad \downarrow \quad \downarrow \quad \downarrow \sqrt{4} \\ (x - 2)^2 - 9 \end{array}$$

2, -9

- 1.) 2020 it
- 2.) factor out a term
- 3.) $(\frac{b}{2})^2$

Vertex: (2, -9)

$$(x-2)^2 - 9 = 0 \quad \sqrt{(x-2)^2} = \sqrt{9}$$

$$\quad \quad \quad +9 \quad +9 \quad \quad \quad x - 2 = \pm 3$$

