Name Key Date _____ Per ____

Unit 9B Study Guide **Algebra 1-2**

Use the function to identify the quadratic properties AND GRAPH the function.

1) $f(x) = x^2 + 8x + 15$

(x) $\frac{-b}{2a} = \frac{-8}{2(1)} = \frac{-8}{2} = -4$

(y) $(-4)^2 + 8(-4) + 15$
$16 - 32 + 15$
$-16 + 15 = -1$

$0 = x^2 + 8x + 15$
$0 = (x+5)(x+3)$
$x = -5, -3$

$y = (0)^2 + 8(0) + 15$
$y = 15$

Vertex: $(-4, -1)$

Max or Min at what? -1

Axis of Sym: $x = -4$

Zeros: $(-5, 0)$ $(-3, 0)$

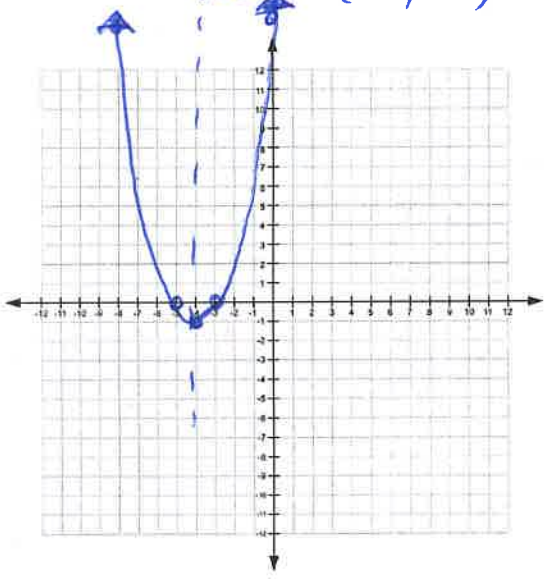
Y-Int: $(0, 15)$

Graph!

D: $(-\infty, \infty)$ R: $[-1, \infty)$

Inc: $(-4, \infty)$ Dec: $(-\infty, -4)$

Pos: $(-\infty, -5) \cup (-3, \infty)$ Neg: $(-5, -3)$



2) $f(x) = -2x^2 - 8x - 6$

(x) $\frac{-b}{2a} = \frac{-(-8)}{2(-2)} = \frac{8}{-4} = -2$

(y) $-2(-2)^2 - 8(-2) - 6$
$-2(4) + 16 - 6$
$-8 + 16 - 6$
$8 - 6 = 2$

$0 = -2(x^2 + 4x + 3)$
$0 = -2(x+3)(x+1)$
$x = -3 \quad x = -1$

$y = -2(0)^2 - 8(0) - 6$
$y = -6$

Vertex: $(-2, 2)$

Max or Min at what? 2

Axis of Sym: $x = -2$

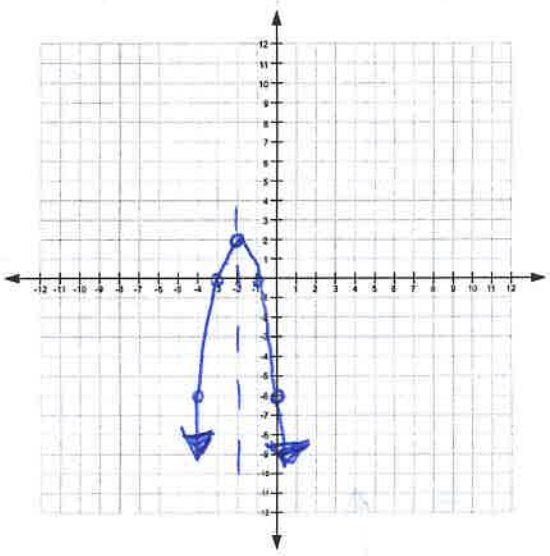
Zeros: $(-3, 0)$ $(-1, 0)$

Y-Int: $(0, -6)$

D: $(-\infty, \infty)$ R: $(-\infty, 2]$

Inc: $(-\infty, -2)$ Dec: $(-2, \infty)$

Pos: $(-3, -1)$ Neg: $(-\infty, -3) \cup (-1, \infty)$



Convert the following standard form problems into vertex form.

3) $y = x^2 + 8x + 12$

$-12 \quad -12$

$y - 12 + 16 = x^2 + 8x + 16$

$y + 4 = (x+4)^2$

$-4 \quad -4$

$y = (x+4)^2 - 4$

	x	$+4$
x	x^2	$4x$
$+4$	$4x$	16

4) $f(x) = x^2 - 2x - 6$

$+6 \quad +6$

$f(x) + 6 + 1 = x^2 - 2x + 1$

$f(x) + 7 = (x-1)^2$

$-7 \quad -7$

$f(x) = (x-1)^2 - 7$

	x	-1
x	x^2	$-1x$
-1	$-1x$	$+1$

Name _____ Date _____ Per ____

Unit 9B Study Guide **Algebra 1-2**

5) $y = x^2 - 14x + 16$

$y - 16 = x^2 - 14x$

$y - 16 + 49 = x^2 - 14x + 49$

$y + 33 = (x-7)^2$

$y = (x-7)^2 - 33$

x | −7
x | x^2 | −7x
−7 | −7x | 49

6) $f(x) = 2x^2 + 20x - 14$

$f(x) = x^2 + 10x - 7$

$f(x) + 14 = x^2 + 10x$

$f(x) + 14 + 25 = x^2 + 10x + 25$

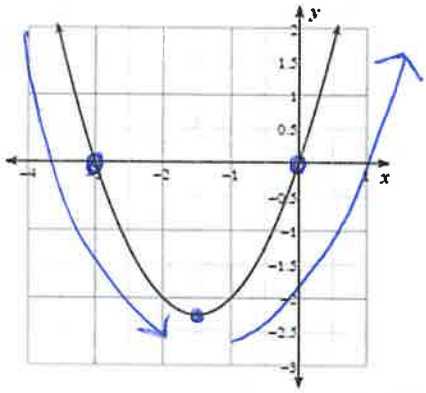
$f(x) + 39 = (x+5)^2$

$f(x) = (x+5)^2 - 39$

x | 5
x | x^2 | 5x
5 | 5x | 25

Use the graph to identify the quadratic properties. ***(estimate numbers as needed)***

7)



Vertex: $(-1\frac{1}{2}, -2\frac{1}{4})$ Max or Min at what? $-2\frac{1}{4}$

Axis of Sym: $x = -1\frac{1}{2}$ Y-Int: $(0,0)$

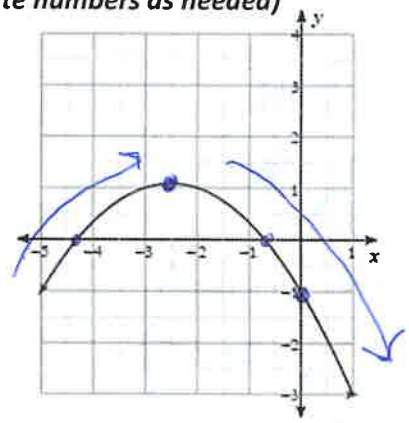
Zeros: $(-3,0)$ $(0,0)$

D: $(-\infty, \infty)$ R: $[-2\frac{1}{4}, \infty)$

Inc: $(-1\frac{1}{2}, \infty)$ Dec: $(-\infty, -1\frac{1}{2})$

Pos: $(-\infty, -3) \cup (0, \infty)$ Neg: $(-3,0)$

8)



Vertex: $(-2.5, 1)$ Max or Min at what? 1

Axis of Sym: $x = -2.5$ Y-Int: $(0,-1)$

Zeros: $(-4.4,0)$ $(-.75,0)$

D: $(-\infty, \infty)$ R: $(-\infty, 1]$

Inc: $(-\infty, -2.5)$ Dec: $(-2.5, \infty)$

Pos: $(-4.4, -.75)$ Neg: $(-\infty, -4.4) \cup (-.75, \infty)$

Graph the following quadratic functions from vertex form.

9) $f(x) = (x+1)^2 + 4$

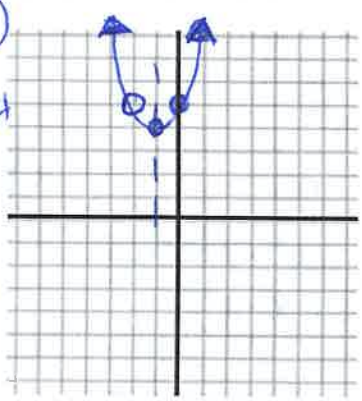
V: $(-1, 4)$

$y = (0+1)^2 + 4$

$= 1 + 4$

$y = 5$

*and reflect



10) $g(x) = -(x-3)^2 + 6$

V: $(3, 6)$

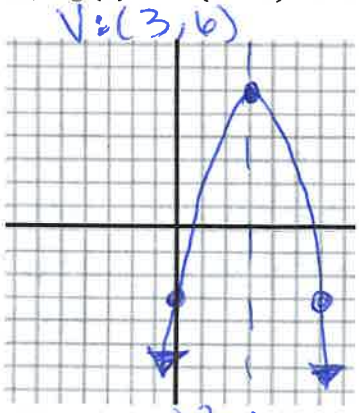
$y = -(0-3)^2 + 6$

$= -(-3)^2 + 6$

$= -9 + 6$

$= -3$

*and reflect



11) $h(x) = -(x-1)^2$

V: $(1, 0)$

$y = -(0-1)^2$

$y = -(-1)^2$

$y = -1$