Analytic Geometry   Name_____Date_____

Graphing and Characteristics from Vertex form Review

Write a quadratic function in vertex form with the following transformations:

1) Reflection across the x-axis, horizontal stretch by 5, vertical shift down 8

$y = -(\frac{1}{5}x)^2 - 8$

2) Vertical stretch by 7, horizontal shift to the right 4, vertical shift up 2

$y = 7(x-4)^2 + 2$

3) Reflection across the x-axis, horizontal shrink by $\frac{1}{5}$, vertical shift up 1

$y = -(5x)^2 + 1$

4) Horizontal shift right 9, vertical stretch by 4

$y = 4(x-9)^2$

List the Transformations.

5) $y = \frac{1}{6}(x-14)^2 - 2$	6) $y = -(x+7)^2 + 9$	7) $y = (\frac{4}{5}x)^2 - 13$
• V. shrink by $\frac{1}{6}$ • right 14 • down 2	• reflect across x-axis • left 7 • up 9	• h. stretch by 5/4 • down 13

Find the x and y – intercepts of the following functions. Write answers as ordered pairs.

| 8) $f(x) = (x+1)^2 - 4$ x-int: (1,0)
$(x+1)^2 - 4 = 0$ (-3,0)
$(x+1)^2 = 4$ y-int: $(0+1)^2 - 4$
$x+1 = \pm 2$ $1 - 4 = -3$
$\frac{-1 \quad -1}{}$ $(0,-3)$
$x = 1 \ \& -3$ | 9) $f(x) = -2(x+2)^2 + 3$ x-int: $(-2\pm\sqrt{3/2}, 0)$
$-2(x+2)^2 + 3 = 0$ y-int: $-2(0+2)^2 + 3$
$-2(x+2)^2 = -3$ $-2(4)+3$
$(x+2)^2 = 3/2$ $-8+3 = -5$
$x+2 = \pm\sqrt{3/2}$ $(0,-5)$
$x = -2\pm\sqrt{3/2}$ |

10) With just looking at the function (no need to graph it), will the function in number 8 have a minimum or a maximum? Explain... **Minimum, it opens up b/c there's no reflection over x.**

11) With just looking at the function (no need to graph it), will the function in number 9 have a minimum or a maximum? Explain... **Maximum, it opens down b/c it has a reflection across the x axis**

12) $f(x) = -2(x-3)^2 + 4$
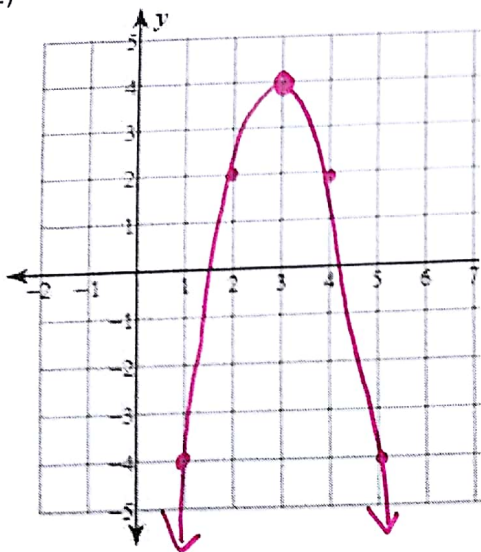
X	y
1	-4
2	2
3	4
4	2
5	-4

C) Direction **Down**

D) Vertex $(3, 4)$

E) AOS $X = 3$

F) Domain $\mathbb{R}$

G) Range $y \le 4$

H) X-Int

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

$-2(x-3)^2 = -4$

$(x-3)^2 = 2$

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

$\rightarrow X = 3 \pm \sqrt{2}$

$(3 \pm \sqrt{2}, 0)$

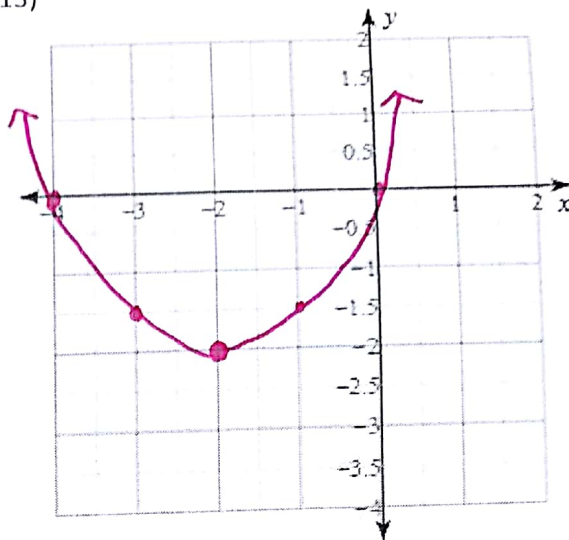I) Y-Int

$-2(0-3)^2 + 4 = -14$

$(0, -14)$

J) Max/Min $(3, 4)$

K) Int. of Inc $(-\infty, 3)$

Int of Dec $(3, \infty)$

L) End Behavior

As $X \rightarrow -\infty, f(x) \rightarrow -\infty$

As $X \rightarrow \infty, f(x) \rightarrow -\infty$

---

13) $f(x) = \frac{1}{2}(x+2)^2 - 2$

-4	0
-3	-1.5
-2	-2
-1	-1.5
0	0

C) Direction **UP**

D) Vertex $(-2, -2)$

E) AOS $X = -2$

F) Domain $\mathbb{R}$

G) Range $y \ge -2$

H) X-Int

$(-4, 0)$ & $(0, 0)$ ← find on graph

I) Y-Int $(0, 0)$ ← find on graph

J) Max/Min $(-2, -2)$

K) Int. of Inc $(-2, \infty)$

Int of Dec $(-\infty, -2)$

L) End Behavior

As $X \rightarrow -\infty, f(x) \rightarrow \infty$.

As $X \rightarrow \infty, f(x) \rightarrow \infty$.