

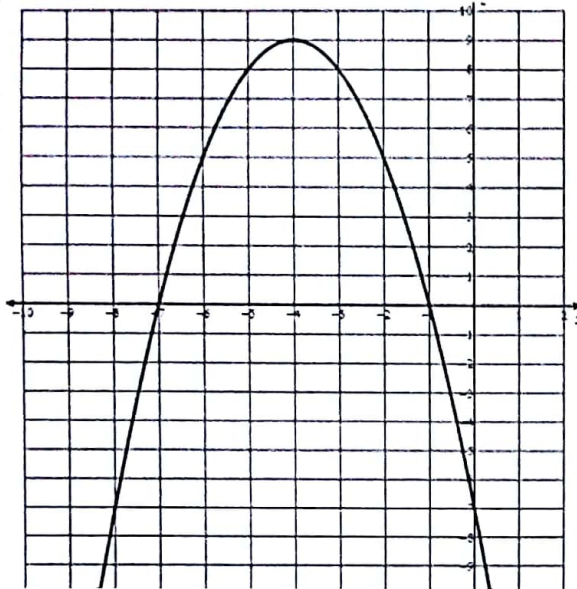
Name _____

Analytic Geometry

Date _____ Period _____

Module 15 Test Review

1)



Use the graph to identify the following:

- a. Vertex $(-4, 9)$
- b. AOS $x = -4$
- c. Min/Max $\text{max } 9$
- d. Domain \mathbb{R}
- e. Range $y | y \leq 9$
- f. X-Int (zeros) $(-7, 0)$ $(-1, 0)$
- g. Y-Intercept $(0, -7)$
- h. Int of Increase $(-\infty, -4)$
- i. Int of Decrease $(-4, \infty)$

Find the x and y intercepts for the following quadratic functions.

2) $y = 5x^2 - 4x - 3$

$\left(\frac{2 \pm \sqrt{19}}{5}, 0\right)$ x-int.

$(0, -3)$ y-int.

3) $y = x^2 - 5x - 2$

$\left(\frac{5 \pm \sqrt{33}}{2}, 0\right)$ x-int

$(0, -2)$ y-int.

Find the AOS and the vertex for each function.

4) $y = 3x^2 - 12x + 1$

AOS $x = 2$

$V(2, -11)$

5) $y = \frac{1}{2}(x - 7)^2 - 2$

AOS $x = 7$

$V(7, -2)$

List the transformations for the following functions.

6) $y = -\left(\frac{4}{3}x\right)^2$

- reflection across the x-axis
- horizontal shrink by a factor of $\frac{3}{4}$

7) $y = 6(x-7)^2 - 2$

- vertical stretch by a factor of 6
- horizontal shift right 7 units
- vertical shift down 2 units

Write a quadratic function based on the following transformations.

8) The parent function has a vertical stretch by factor of 5, is reflected over the x-axis and is horizontally shifted left 8.

$$y = -5(x+8)^2$$

9) The parent function is vertically shifted up 1, reflected over the y-axis and has a vertical shrink of $\frac{1}{3}$.

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

Convert between each form

10) $y = -4(x+5)^2 - 3$

11) $y = x^2 + 6x - 4$

12) $y = x^2 - 10x + 8$

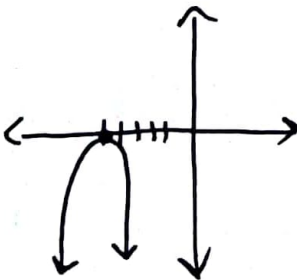
$$y = -4x^2 - 40x - 103$$

$$y = (x-5)^2 - 17$$

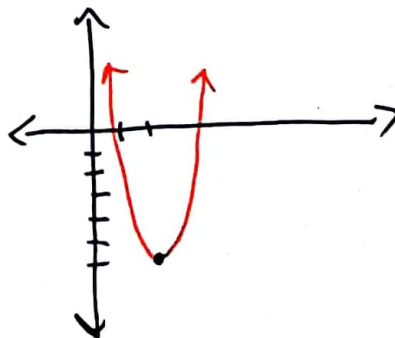
$$y = (x+3)^2 - 13$$

Graph a sketch of the following functions. (Plot the vertex and draw parabola opening in the correct direction)

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



14) $f(x) = 3(x-2)^2 - 6$



Determine the given characteristics of the quadratics listed. Graph each using a 5 point chart.

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

$$15) f(x) = -2x^2 - 8x + 3$$

Direction **down**

Vertex **$(-2, 11)$**

AOS **$x = -2$**

Domain **\mathbb{R}**

Range **$y | y \leq 11$**

X-Intercept **$\frac{4 \pm \sqrt{22}}{-2}$**

Y-Intercept **$(0, 3)$**

Max/Min? Where? **Max $(-2, 11)$**

Int of Inc **$(-\infty, -2)$**

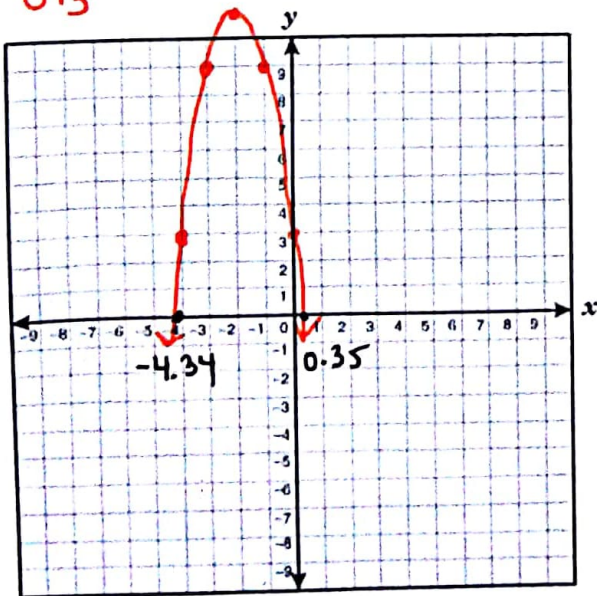
Int of Dec **$(-2, \infty)$**

End Behavior **$x \rightarrow -\infty, f(x) \rightarrow -\infty$
 $x \rightarrow \infty, f(x) \rightarrow -\infty$**

x	y
-4	3
-3	9
-2	11
-1	9
0	3

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(-2)(3)}}{2(-2)}$$

$$\frac{8 \pm \sqrt{88}}{-4} \quad \frac{8 \pm 2\sqrt{22}}{-4}$$



$$16) f(x) = 3(x - 1)^2 + 2$$

UP
 $(1, 2)$

$x = 1$

\mathbb{R}

$y | y \geq 2$

no xint.

Yint $(0, 5)$

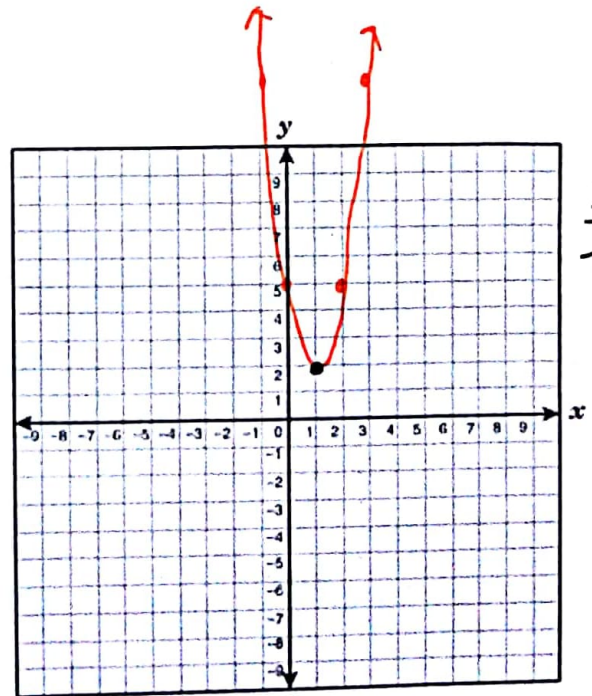
Min $(1, 2)$

$(1, \infty)$

$(-\infty, 1)$

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

$x \rightarrow \infty, f(x) \rightarrow \infty$



x	y
-1	14
0	5
1	2
2	5
3	14

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

Determine the given characteristics of the quadratics listed. Graph each using a 5 point chart.

17) $f(x) = x^2 - 4x + 3$

$$(x-1)(x-3)$$

$$x-1=0 \quad x-3=0$$

$$x=1 \quad x=3$$

Direction Up

Vertex $(2, -1)$

AOS $x=2$

Domain \mathbb{R}

Range $y|y \geq -1$

X-Intercept $(1, 0)$ $(3, 0)$

Y-Intercept $(0, 3)$

Max/Min? Where? Min $(2, -1)$

Int of Inc $(2, \infty)$

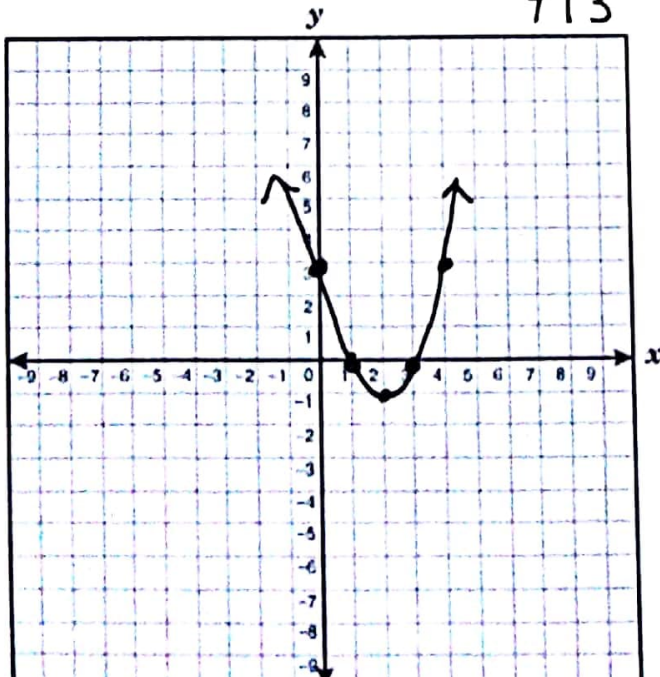
Int of Dec $(-\infty, 2)$

End Behavior

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

$$x \rightarrow \infty, f(x) \rightarrow \infty$$

x	y
0	3
1	0
2	-1
3	0
4	3



18) $f(x) = (x+2)^2 - 8$

UP
 $V(-2, -8)$
 $x = -2$
 \mathbb{R}

$y|y \geq -8$

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

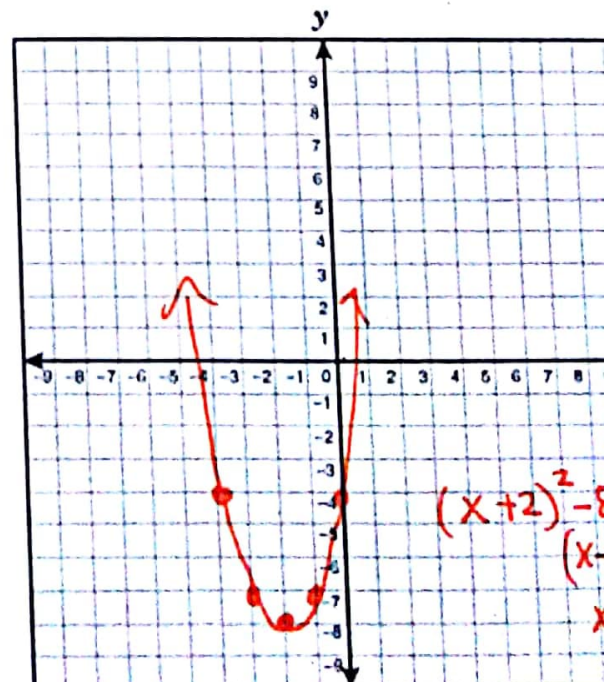
$(0, -4)$
 Min $(-2, -8)$

Inc $(-2, \infty)$

Dec $(-\infty, -2)$

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

$$x \rightarrow \infty, f(x) \rightarrow \infty$$



19. What methods can you use to solve for the x-intercepts? *quadratic formula, factoring, completing the square, square root*

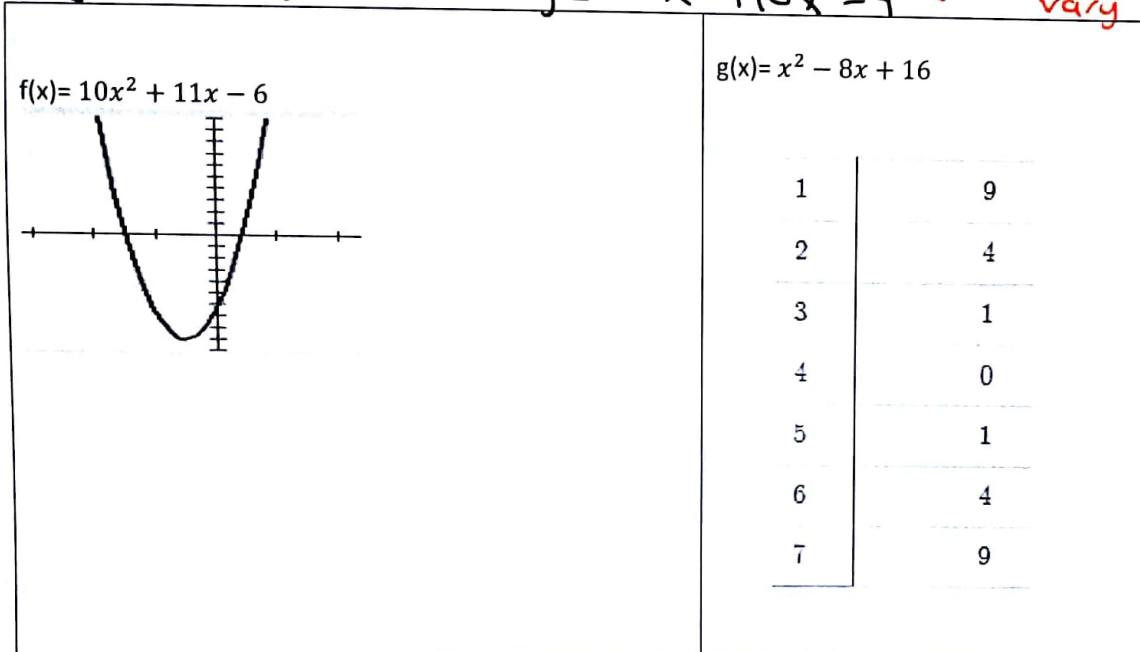
20. Write the quadratic formula.

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

21. Write a quadratic equation in vertex form and write one in standard form.

$$y = 5(x-4)^2 + 7$$

$$y = 5x^2 + 10x - 4 \quad (\text{answers will vary})$$



22. If $f(x)$ is shifted up 10 units, and $g(x)$ stayed the same, which function would have the lowest minimum? *$g(x)$ has the lowest minimum*

23. Which function has the highest y-intercept? *$g(x)$ has the highest y-int.*

24. What is/are the x-intercept(s) of $f(x)$? What is/are x-intercept(s) of $g(x)$?

x-int of $f(x)$

x-int of $g(x)$

$$\left\{-\frac{3}{2}, \frac{2}{5}\right\}$$

$$\{4\}$$

25. Which function has the most solutions?

$f(x)$ has the most solutions

26. Which function's interval of increase starts farther to the left?

$f(x)$'s interval of increase starts farther to the left.

27. Where is the average rate of change the greatest? $f(x) = 2x^2 - 8x + 10$

$[-4, -1]$
slope = -18

$[-1, 0]$
slope = -10

$[1, 4]$
slope = 2

$[2, 6]$
slope = 8

The greatest rate of change is between -4 and -1.