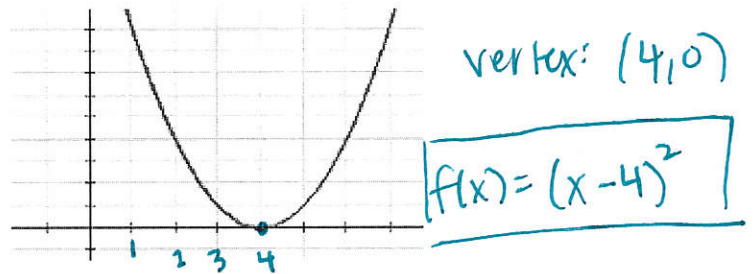
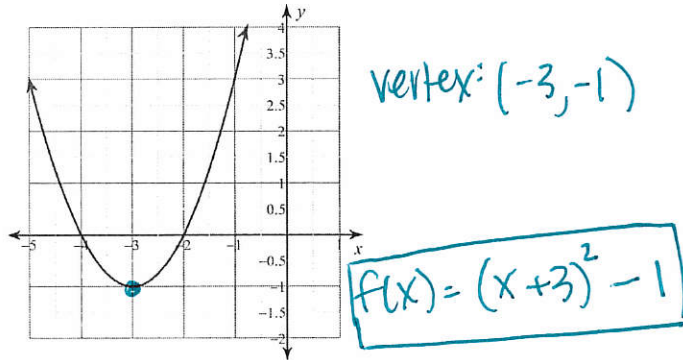


## Math 2 Final Review: Free Response

Name: KEY Hour: \_\_\_\_\_

Read all instructions completely. Show all of your work. No points will be given without appropriate work being shown and answers indicated.

1. Write a quadratic equation in vertex form for each graph below.

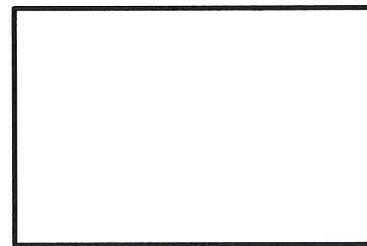


2. Given the following rectangle, calculate the **area** of the rectangle:

$$(-2x+13)(4x-5)$$

$$-8x^2 + 10x + 52x - 65$$

$A(x) = -8x^2 + 62x - 65$



$4x - 5$

$-2x + 13$

3-4. Write a quadratic function that fits the given criteria.

3. Vertex at  $(2, -3)$  through  $(0, -7)$ , written in vertex form:

$h$   $k$        $x$   $y$

$$y = a(x-h)^2 + k$$

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

$$-7 = a(0-2)^2 + (-3)$$

$$-7 = 4a - 3 \quad \frac{-4}{4} = \frac{4a}{4} \quad a = -1$$

4. Solutions at  $x = -4$  and  $x = \frac{2}{3}$ , written in standard form:

$$\begin{array}{l} x = -4 \\ +4 \quad +4 \end{array} \quad \begin{array}{l} 3x = \frac{2}{3} \\ -2 \quad -2 \end{array} \quad \begin{array}{l} x+4 = 0 \\ 3x-2 = 0 \end{array}$$

$$f(x) = (x+4)(3x-2) \Rightarrow 3x^2 - 2x + 12x - 8 = \boxed{3x^2 + 10x - 8}$$

5. Write the equation for a quadratic function that has a vertical stretch of 4, shifted right 2 units, and shifted up 9.

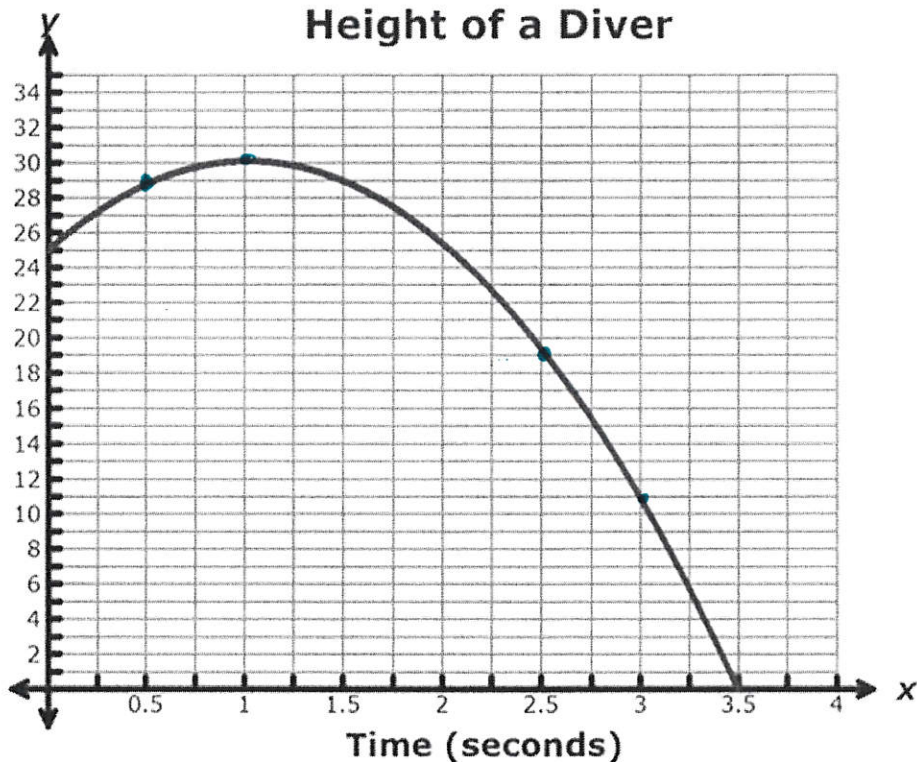
$$f(x) = 4(x-2)^2 + 9$$

6. Write the equation for a quadratic function that is reflected over the x-axis, shifted down 1 unit, and compressed by a factor of 2/3.

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

The graph represents the height of a diver over the course of one dive.

Height of a Diver



7. What is the height of the diver 3 seconds after she jumps?

11 ft.

8. How long does it take for the diver to hit the water?

3.5 seconds

9. How long does it take for the diver to reach maximum height?

1 second

10. What is the maximum height of the diver?

30 ft.

11. What is the real world domain of the function?

$[0, 3.5]$

12. What is the real world range of the function?

$[0, 30]$

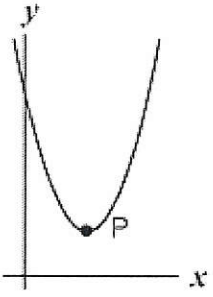
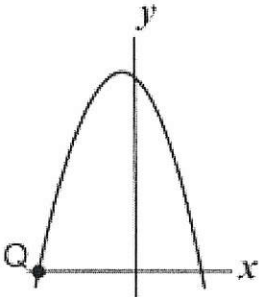
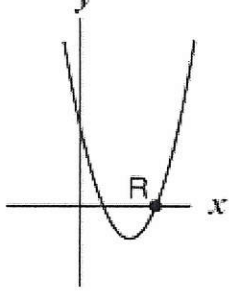
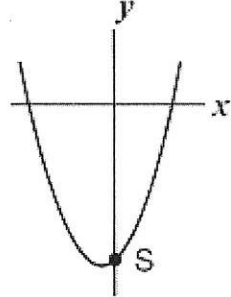
13. What is the average rate of change of the diver on the interval  $[0.5, 2.5]$ ?

$$\frac{(0.5, 29) \quad (2.5, 19)}{2.5 - 0.5} = \frac{19 - 29}{2} = \frac{-10}{2} = \boxed{-5}$$

$$\frac{f(b) - f(a)}{b - a}$$

Between  $[0.5, 2.5]$  the diver is decreasing on average by 5.

Below are four equations of quadratic functions and four sketches of quadratic graphs.

<p>A. <math>y = x^2 - 6x + 8</math></p>	<p>B. <math>y = (x - 6)(x + 8)</math></p>	<p>C. <math>y = (x - 6)^2 + 8</math></p>	<p>D. <math>y = -(x + 8)(x - 6)</math></p>
<p>A.</p> 	<p>B.</p> 	<p>C.</p> 	<p>D.</p> 

Match the equation to its graph and explain your decision using key features such as vertex, x-intercepts or y-intercept.

14. Equation A *matches* Graph C, because its vertex is at  $(\frac{-(-6)}{2}, f(\frac{-(-6)}{2}))$  which is  $(3, -1)$  and a y-intercept of 8.

15. Equation B *matches* Graph D, because it has zeros at  $(6, 0) \neq (-8, 0)$  and has a minimum

16. Equation C *matches* Graph A, because its vertex is at  $(6, 8)$  with the function having a minimum value

17. Equation D *matches* Graph B, because it has been reflected over the x-axis and has x-intercepts of  $(-8, 0) \neq (6, 0)$

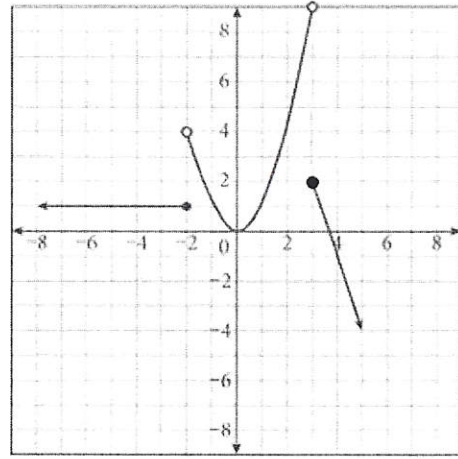
18. Write the coordinates of the points:

$P(6, 8)$        $Q(-8, 0)$        $R(4, 0)$        $S(0, -48)$

$(x-4)(x-2)$        $(0-6)(0+8)$   
 $0, -48$

19. Write the piecewise function for the given graph:

$$f(x) = \begin{cases} 1, & x \leq -2 \\ x^2, & -2 < x < 3 \\ -3x+11, & x \geq 3 \end{cases}$$



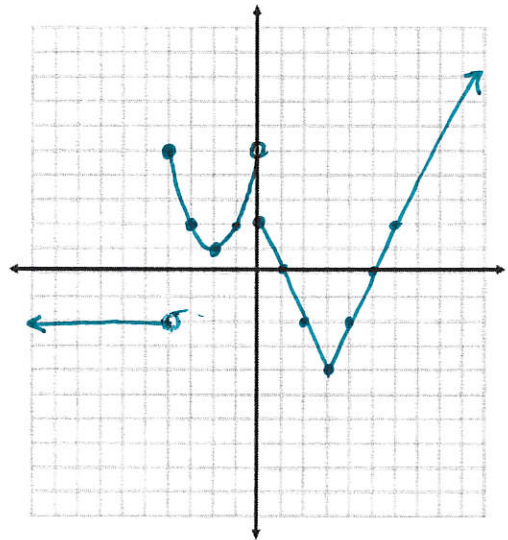
20. Graph the given piecewise function:

$$f(x) = \begin{cases} -2, & x < -4 \\ (x+2)^2 + 1, & -4 \leq x < 0 \\ 2|x-3| - 4, & x \geq 0 \end{cases}$$

Find  $f(-6) = \underline{-2}$

Find  $f(-4) = \underline{5}$

Find  $f(0) = \underline{2}$



21. Graph the following function:  $f(x) = -\frac{1}{4}|x+1| - 5$

