

## Unit 3B Race Car Review

A rocket is launched with an initial speed of 64ft per second and a starting height of 512 feet. Using the equation  $h(t) = -16t^2 + 64t + 512$ , answer questions 1 - 5.

1. What is the rocket's height at 1 second?  
560 feet
2. Find the vertex of the rocket.  
(2, 516)
3. What is the maximum height of the rocket?  
516 ft
4. When does the rocket reach the maximum height and change direction?  
2 seconds
5. When does the rocket hit the ground?  
8 seconds

6. Using the following table find the rate of change for the Quadratic function over the interval  $3 \leq x \leq 5$ .

(3, 9)  
(5, 25)

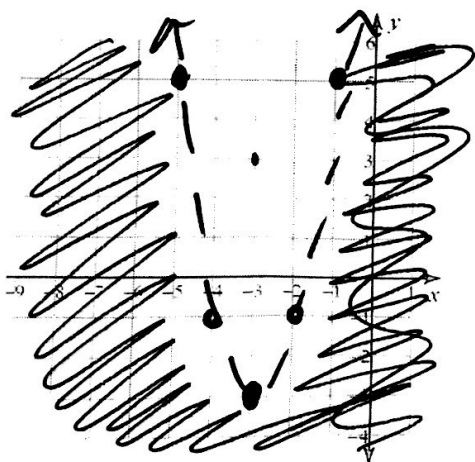
$$\frac{25 - 9}{5 - 3} =$$

$ROC = 8$

x	y
1	9
2	7
3	9
4	15
5	25

7. A) Graph the quadratic inequality.

$$y < 2x^2 + 12x + 15$$



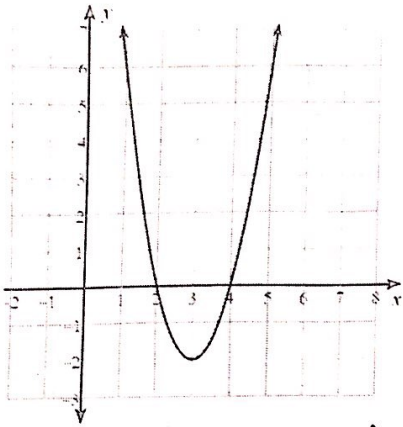
- B) Name a possible solution to the inequality in 7A.

Ex: (0, 0)

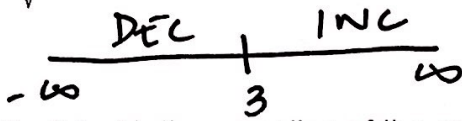
Anything on outside

8. Using the following graph find the given characteristics.

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



- Vertex:  $(3, -2)$       AOS:  $x = 3$   
 Domain:  $(-\infty, \infty)$       Range:  $[-2, \infty)$   
 x-int(s):  $(2, 0) (4, 0)$       y-int:  $(0, 16)$   
 Extrema:  $\text{min @ } (3, -2)$   
 Interval of Increase:  $(3, \infty)$   
 Interval of Decrease:  $(-\infty, 3)$   
 End Behavior:  
 $x \rightarrow \infty, f(x) \rightarrow \infty$   
 $x \rightarrow -\infty, f(x) \rightarrow \infty$



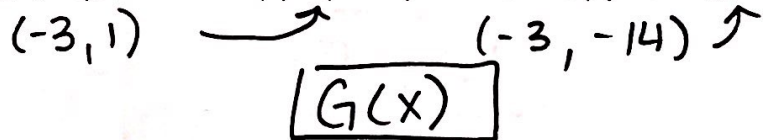
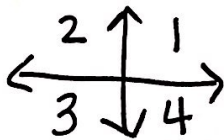
9. What is the equation of the graph in #8 in vertex form? (Try to write the equation from the graph).

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

10. What is the y-intercept of the quadratic function:  $f(x) = -(x - 4)^2 + 2$ ?

$$(0, -14)$$

11. Which function has a vertex in the 3<sup>rd</sup> quadrant?  $F(x) = (x + 3)^2 + 1$  OR  $G(x) = x^2 + 6x - 5$



12. Jessica converted  $f(x) = 2x^2 + 4x + 5$  into vertex form and decided the answer should be  $f(x) = 2(x - 1)^2 + 3$ . Is Jessica's Vertex form of the equation correct? If she did make a mistake how could she correct it?

$$a = 2 \quad h = -1 \quad k = 3$$

Not correct,  $y = 2(x + 1)^2 + 3$

13. Use the following description to write a quadratic function in vertex form. The parent function  $f(x) = x^2$  is translated left 2 units, vertically shrunk by a scale factor of  $\frac{1}{2}$  and translated down 5 units.

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