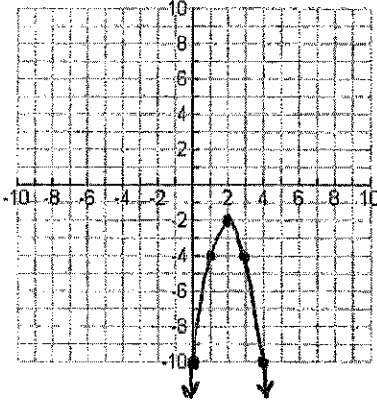


Applications of Quadratics From Graphs

Name: Key Hr: _____

Given the function below find the following.

1. $y = -2x^2 + 8x - 10$ $h = \frac{-b}{2a}$ $h = \frac{-8}{2(-2)}$ $h = 2$



$k = -2(2)^2 + 8(2) - 10$

$k = -2$

$f(1) = -2(1)^2 + 8(1) - 10$

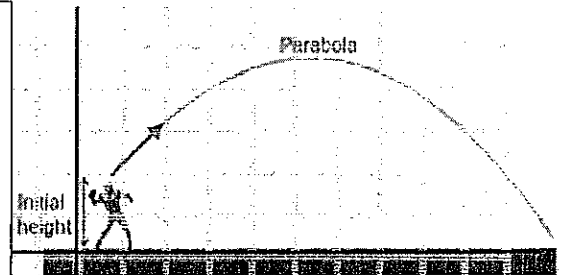
$f(1) = -4$

- A) Vertex Form $y = -2(x-2)^2 - 2$
- B) Vertex $(2, -2)$
- C) Axis of Symmetry $x = 2$
- D) Max/Min $\text{max at } -2$
- E) x-intercept None
- F) y-intercept -10
- G) Domain and Range $D: \mathbb{R}$ Range: $(-\infty, -2]$
- H) $f(1) = -4$
- I) Sketch the graph

2. Given the picture below, match the key features on the left to real world application on the right.

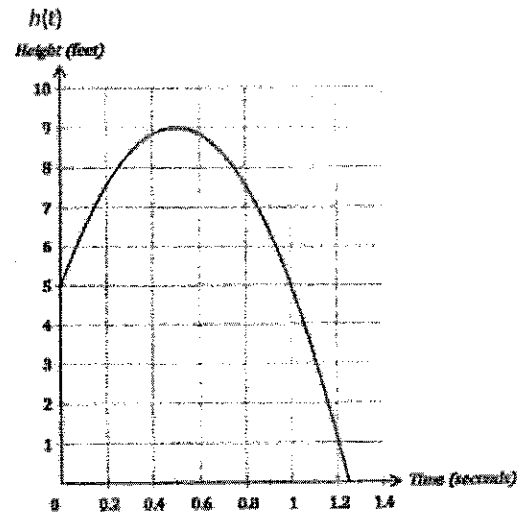
- A. x coordinate of the Vertex (h) **g**
- B. y coordinate of the Vertex (k) **d**
- C. y-intercept **b**
- D. x-intercept **e**
- E. Realistic domain **a**
- F. Realistic Range **f**
- G. $f(3)$: Substitute 3 in for x and find y **c**

- a) The starting distance to the ending distance
- b) Starting height
- c) at a distance of 3 units how high is the ball
- d) Maximum height
- e) Where it lands
- f) From ground level to the maximum height
- g) How far it has gone at the maximum height



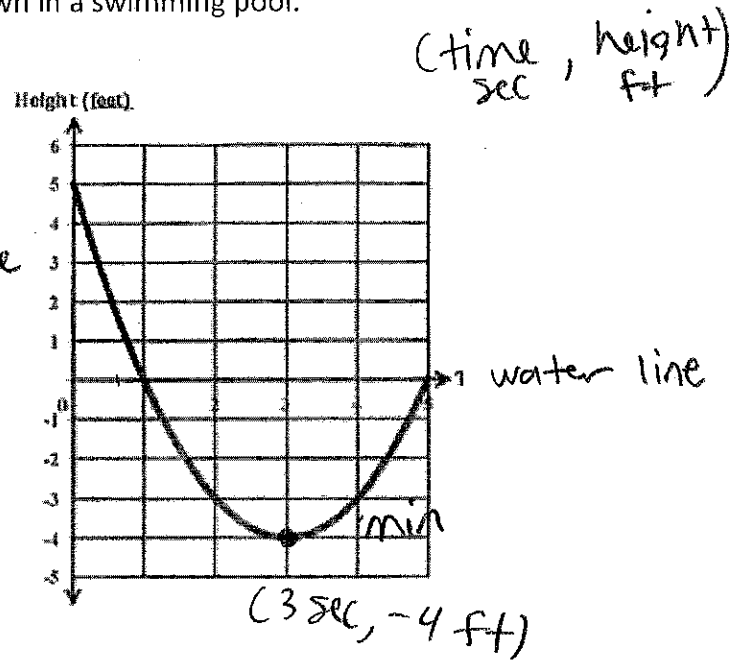
3. The graph $h(t)$ represents the height of a tennis ball thrown upward.

- a) Domain: $[0, 1.25]$
- b) Range: $[0, 9]$
- c) When does the tennis ball reach its maximum height? **0.5 sec**
- d) What is the maximum height of the tennis ball? **9 ft**
- e) $h(0)$ **5 ft**
- f) $h(0.2)$ **7.5 ft**
- g) $h(1)$ **5 ft**
- h) What does $h(0.2)$ represent? **at a time of 0.2 the ball is 7.5 ft high**
- i) What does the y-intercept represent? What is the y-intercept? **starting height 5 ft**
- j) What does the x-intercept represent? What is the x-intercept? **when the ball hits the ground 1.25**



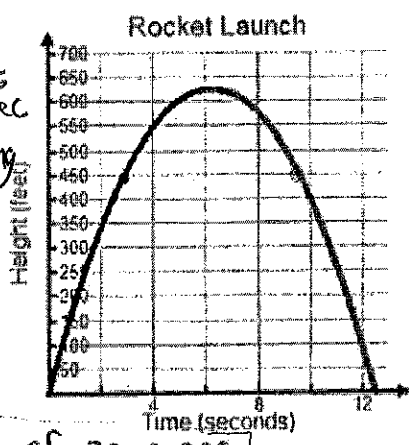
4. The graph represents the height of an air-filled ball thrown in a swimming pool.

- a. Domain: $[0, 5]$ Range: $[-4, 5]$
 or $0 \leq x \leq 5$ or $-4 \leq y \leq 5$
- b. What does the y-intercept represent?
 starting height (it's 5 ft)
- c. What does the x-intercept represent?
 when the ball is on the water surface
- d. When does the ball reach the minimum height?
 3 seconds
- e. What is the minimum height?
 -4 ft
- f. Estimate the time (in seconds) when the ball has a height of -2 feet?
 4.5 sec and 1.5 sec.
- g. Estimate the height of the ball at 0.5 seconds?
 2 ft
- h. Estimate the height of the ball at 2 seconds?
 -3 ft



5. The graph $h(t)$ represents the height of a rocket shot up into the sky. The equation is $h(t) = -16t^2 + 200t$. Use the graph as a guide to find what is asked below. Then use the equation to find the exact answers.

- a. Find the Domain and write a sentence describing the meaning of the domain for $h(t)$. $[0, 12.5]$
 the rocket starts at zero seconds and lands at 12.5 sec
- b. Find the Range and write a sentence describing the meaning of the range for $h(t)$. $[0, 625]$, The starting height is zero and the maximum height is 625.
- c. Find the y-intercept, and describe what it represents? y int: zero, the starting height is zero feet.
- d. Find the x-intercepts, and describe what they represents? $-8t = 0$ $2t - 25 = 0$



- e. Find $h(8)$, and describe what it represents? $h(8) = -16(8)^2 + 200(8) = 576$ ft.
 at 8 seconds the height is 576 feet.
- f. Estimate the time(s) (in seconds) that the rocket is at a height of 450 feet.
 from 2.5 seconds to 8.75 seconds, so a total of about 6.25 seconds.
- g. Find the vertex. Describe what the x coordinate and the y coordinate of the vertex represent.
 $h = -200$ $h = 6.25$ $k = -16(6.25)^2 + 200(6.25) = 625$ $v: (6.25, 625)$
 $2(-16)$ X coord. (h): it means at a time of 6.25 seconds the rocket hits the maximum height.
 y coord. (k): it means the maximum height is 625 ft