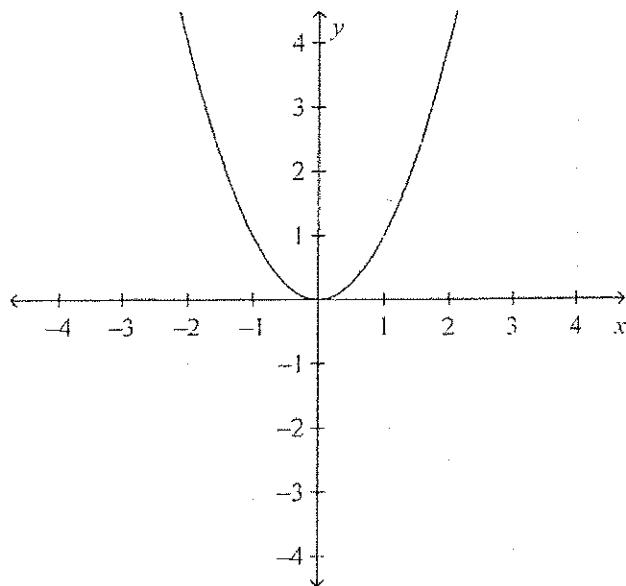






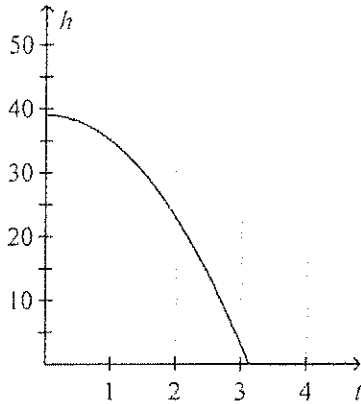
12. Identify the vertex of the graph. Tell whether it is a minimum or maximum.



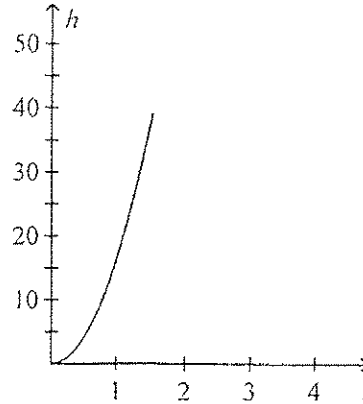
- A (0, 0); maximum                      C (0, 1); minimum  
B (0, 1); maximum                      D (0, 0); minimum
13. A ball is thrown into the air with an upward velocity of 48 ft/s. Its height  $h$  in feet after  $t$  seconds is given by the function  $h = -16t^2 + 48t + 8$ . In how many seconds does the ball reach its maximum height? Round to the nearest hundredth if necessary. What is the ball's maximum height?
- A 1.5 s; 44 ft    B 3 s; 8 ft    C 1.5 s; 116 ft    D 1.5 s; 56 ft
14. Write a function that represents the parent function,  $y = x^2$ , after it has been translated 3 up and 2 right.
- A  $y = (x-3)^2 + 2$                       C  $y = (x+3)^2 - 2$   
B  $y = (x-2)^2 + 3$                       D  $y = (x+2)^2 - 3$
15. A rocket is shot into the air with an initial velocity of 800 m/sec. The equation  $h = -16t^2 + 1440t$  models the height of the ball. How long does it take for the rocket to hit the ground ( $h=0$ )?
- (a) 16 seconds    (b) 800 seconds    (c) 90 seconds    (d) 1440 seconds

16. If an object is dropped from a height of 39 feet, the function  $h(t) = -16t^2 + 39$  gives the height of the object after  $t$  seconds. Graph the function.

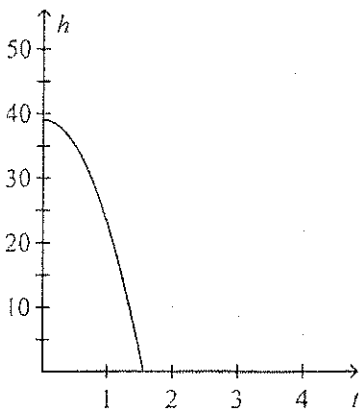
A



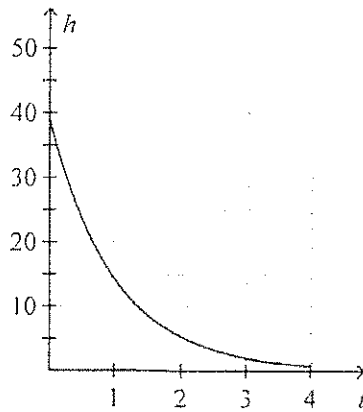
C



B



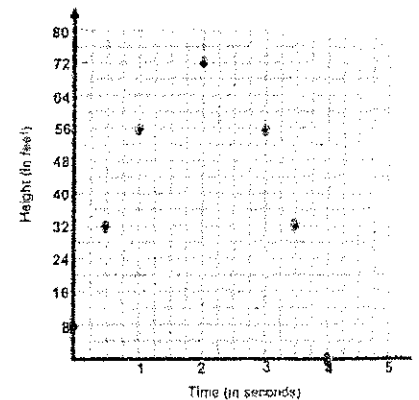
D



17. A ball was shot upward by a machine that was several feet above the ground with an initial speed of 64 feet per second. The height of the ball at any given time can be represented as

$$f(x) = -16x^2 + 64x + 8.$$

The graph to the right represents this function. For which of these times is the rate of change positive?



- A. between 0 and 2 seconds      B. only at 2 seconds  
C. between 2 and 4 seconds      D. only after 4 seconds

18. What does the y-intercept represent in this situation?

- A. the time it takes the ball to reach the ground, 8 seconds.  
B. the maximum height of the ball reaches in the air, 8 seconds  
C. the height from which the ball is shot upward, 8 feet  
D. the speed of the ball, 8 feet per second.

**Constructed Response. Show all work in space provided.**

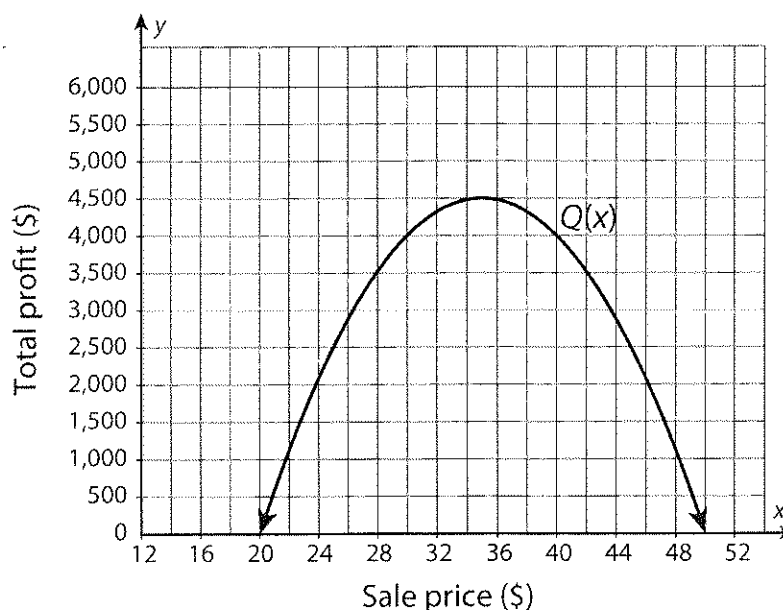
19. An object is launched and follows the path expressed by the function  $h(t) = -16t^2 + 16t + 32$  where  $h$  is the height at  $t$  seconds.

A. Find the height, in feet, of the object at 1 second after it is launched. Explain how you determined your answer.

B. How long will it take before the object hits the ground?

20. You are a manager at a manufacturing company, and are trying to determine the pricing for a new product. Two different consultants come up with profit prediction functions for different prices. Consultant A's predictions are summarized in the table. Consultant B's predictions are summarized in the graph.

$x$	$P(x)$
16	0
20	3,200
24	5,120
28	5,760
32	5,120
36	3,200



- The ideal sale price is the price that maximizes the profit. Which function has a higher ideal sale price?
- Which function predicts a higher maximum profit?
- What does the domain represent in the context of the problem? What is a reasonable domain for each function?
- What does the range represent in the context of the problem? What is a reasonable range for each function?