

Ottocento Lesson #16 Advanced Quadratics Worksheet

Video Solutions at: <https://youtu.be/YVTD7JfwwNY>

Question 1

$$h(t) = -16t^2 + 160t + 384$$

A quadratic function, h , models the height, in feet, of an object above the ground in terms of the time, t , in seconds, after the object is launched off an elevated surface.

At what time after the object is launched, in seconds, does the object reach the ground?

What is the maximum height, in feet, that the object reaches?

What is the initial height of the object, in feet?

At what time after the object is launched, in seconds, does the object reach its maximum height?



Question 2

A quadratic function models the height, in feet, of an object above the ground in terms of the time, in seconds, after the object is launched off an elevated surface. The model indicates the object reaches the ground 8 seconds after launch; the object reaches its maximum height of 400 feet above the ground 3 seconds after being launched. Based on the model, what is the height of the object, in feet, 6.5 seconds after it is launched?

Question 3

A quadratic function models the height, in feet, of an object above the ground in terms of the time, in seconds, after the object is launched off an elevated surface. The model indicates the object launches from an initial height of 311 feet; the object reaches its maximum height of 567 feet above the ground 4 seconds after being launched. Based on the model, at what time after the object is launched, in seconds, does the object first reach a height of 518 feet?



Question 4

$$55x^2 - (33a + 77b)x + ab = 0$$

In the given equation, a and b are positive constants. The sum of the solutions to the given equation is $k(3a + 7b)$, where k is a constant. What is the value of k ?

Question 5

$$-13x^2 - (15b + 7a)x + 20a + 16b = 0$$

In the given equation, a and b are positive constants. The product of the solutions to the given equation is $k(5a + 4b)$, where k is a constant. What is the value of k ?

Question 6

$$f(x) = -2x^2 + bx + c$$

In the given quadratic function, a and c are constants. The graph of $y = f(x)$ is a parabola that has a vertex at the point (h, k) , where h and k are constants. If $k < 0$ and $f(-5) = f(7)$, which of the following must be true?

I. $c < -1$

II. $b \geq 3$

A) I only

B) II only

C) I and II

D) Neither I nor II

Question 7

$$f(x) = ax^2 + bx + c$$

The function f is defined above, where a , b , and c are constants and $4 < b < 7$. The graph of $y = f(x)$ is such that $f(1) = f(5)$. If b is an integer, what could be the value of ab ?



Question 8

$$y = ax^2 + bx + c$$

The equation of a parabola is given, where a , b , and c are constants. In the xy -plane, the parabola has vertex $(5, -9)$ and has zero x -intercepts. Which of the following could be the value of $a - b - c$?

A) -47

B) -5

C) 9

D) 23

Question 9

$$f(x) = ax^2 + bx + c$$

The function f is defined above, where a , b , and c are constants. The graph of $y = f(x)$ in the xy -plane passes through the points $(-16, 0)$ and $(9, 0)$. If a is an integer greater than 3, what is the smallest possible value of $3b - 2a$?



Question 10

$$y = ax^2 + bx + c$$

The equation of a parabola is given, where a , b , and c are constants. In the xy -plane, the parabola has vertex $(3, 11)$ and $c < 0$. Which of the following could be the value of b ?

A) 5

B) 6

C) 7

D) 8