Interpret Quadratics Using Real World Scenarios

Name_____ Period:_____ Date:_____

Directions: Use the information given to solve each problem.

1. An object is launched at an upward velocity of 72 feet per second from the top of a building 200 feet above the ground. Use the vertical motion equation $h = -16t^2 + vt + c$, where h is the ending height of the object, c is the initial height, in feet, of the object, t is the time, in seconds, and v is the velocity of the object.

   How long will it take the object to reach the maximum height, and what is the maximum height?

   Fill in the blanks with the appropriate values.
   At _____ seconds, the object's maximum height will be _____ feet.

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2. An object is launched at an upward velocity of 120 feet per second from the top of a building 150 feet above the ground. Use the vertical motion equation $h = -16t^2 + vt + c$.

   How long will it take the object to reach the maximum height, and what is the maximum height?

   Fill in the blanks with the appropriate values.
   At _____ seconds, the object's maximum height will be _____ feet.

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3. An object is launched at an upward velocity of 50 feet per second from the top of a building 100 feet above the ground. Use the vertical motion equation $h = -16t^2 + vt + c$.

   How long will it take the object to reach the maximum height, and what is the maximum height?

   Fill in the blanks with the appropriate values.
   At _____ seconds, the object's maximum height will be _____ feet.

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4. An object is launched at an upward velocity of 88 feet per second from the top of a building 250 feet above the ground. Use the vertical motion equation $h = -16t^2 + vt + c$.

How long will it take the object to reach the maximum height, and what is the maximum height?

Fill in the blanks with the appropriate values.
At _____ seconds, the object's maximum height will be _____ feet.

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5. An object is launched at an upward velocity of 140 feet per second from the top of a building 300 feet above the ground. Use the vertical motion equation $h = -16t^2 + vt + c$.

How long will it take the object to reach the maximum height, and what is the maximum height?

Fill in the blanks with the appropriate values.
At _____ seconds, the object's maximum height will be _____ feet.

Answer Key

1. **An object is launched at an upward velocity of 72 feet per second from the top of a building 200 feet above the ground.**

   Vertical motion equation:

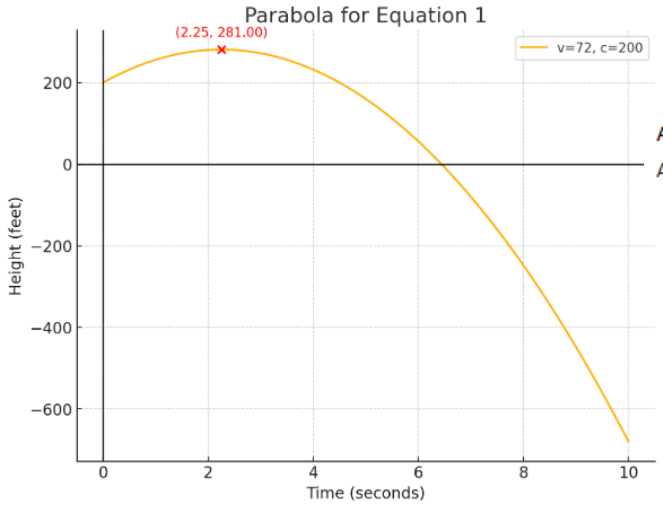
   $h = -16t^2 + vt + c$

   Where:

   - $v = 72$ feet per second
   - $c = 200$ feet

   To find the maximum height and the time it takes to reach it:

   The time to reach the maximum height occurs at the vertex of the parabola, which is given by the formula: $h = -16t^2 + 72t + 200$ *or graph the equation* $\boldsymbol{y = -16x^2 + 72x + 200}$



   Answer:

   At **2.25 seconds**, the object's maximum height will be **281 feet.**

Answer Key

2. **An object is launched at an upward velocity of 120 feet per second from the top of a building 150 feet above the ground.**

Vertical motion equation:

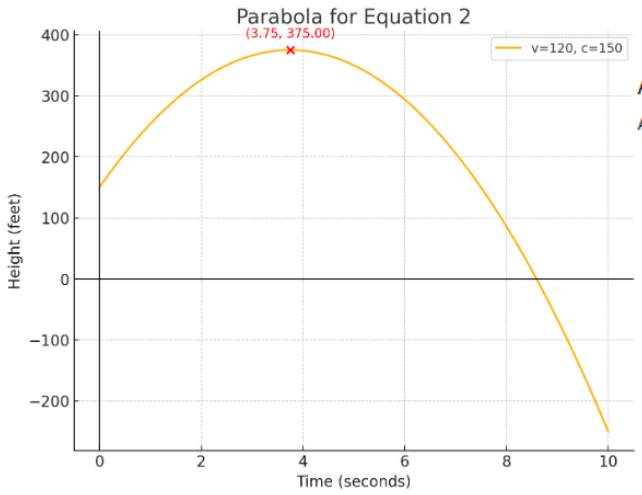
$h = -16t^2 + vt + c$

Where:

- $v = 120$ feet per second
- $c = 150$ feet

To find the time to reach the maximum height:

$$h = -16t^2 + 120t + 150 \quad or\ graph\ the\ equation \quad \boldsymbol{y = -16t^2 + 120t + 150}$$



Answer:

At **3.75 seconds**, the object's maximum height will be **375 feet.**

Answer Key

3. **An object is launched at an upward velocity of 50 feet per second from the top of a building 100 feet above the ground.**

Vertical motion equation:

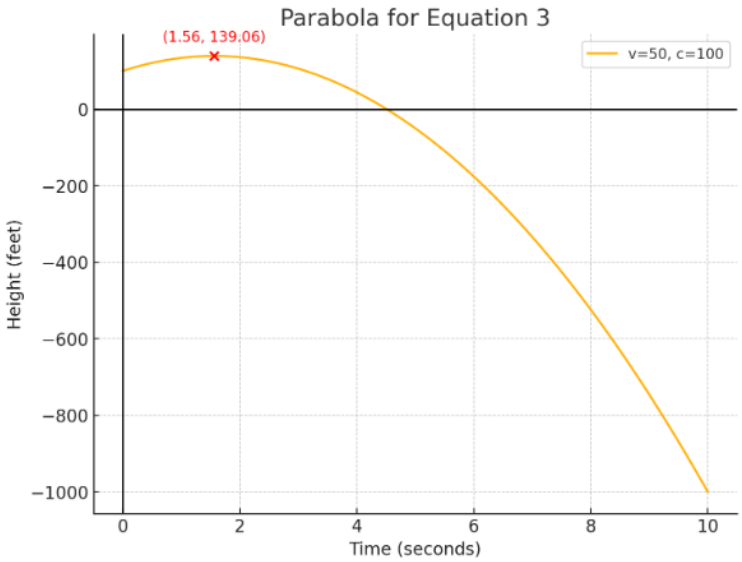
$h = -16t^2 + vt + c$

Where:

- $v = 50$ feet per second
- $c = 100$ feet

To find the time to reach the maximum height:

$$h = -16t^2 + 50t + 100 \quad \textit{or graph the equation} \quad \boldsymbol{y = -16t^2 + 50t + 100}$$



Answer:

At **1.5625 seconds**, the object's maximum height will be **139.06 feet.**

Answer Key

4. **An object is launched at an upward velocity of 88 feet per second from the top of a building 250 feet above the ground.**

   Vertical motion equation:

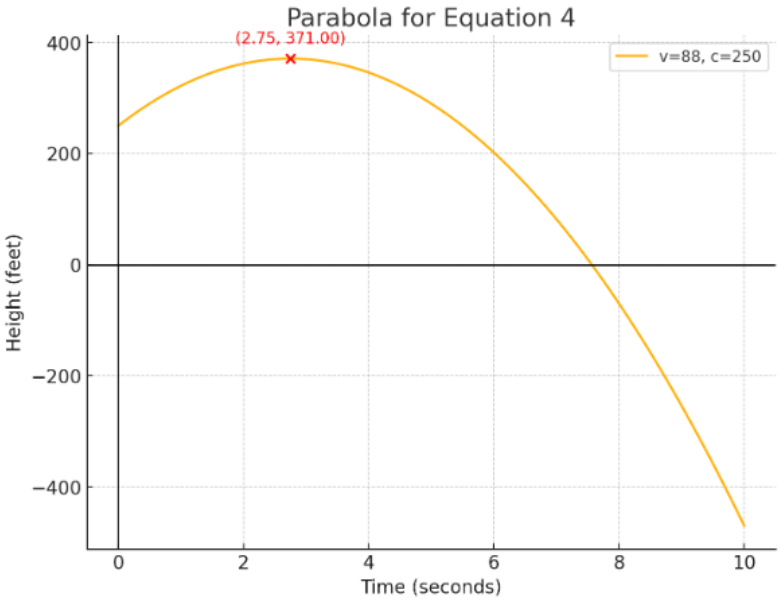
   $h = -16t^2 + vt + c$

   Where:

   - $v = 88$ feet per second
   - $c = 250$ feet

   To find the time to reach the maximum height:

$$h = -16t^2 + 88t + 250 \quad or\ graph\ the\ equation \quad \boldsymbol{y = -16t^2 + 88t + 250}$$



Answer:

At **2.75 seconds**, the object's maximum height will be **371 feet.**

Answer Key

5. **An object is launched at an upward velocity of 140 feet per second from the top of a building 300 feet above the ground.**

   Vertical motion equation:

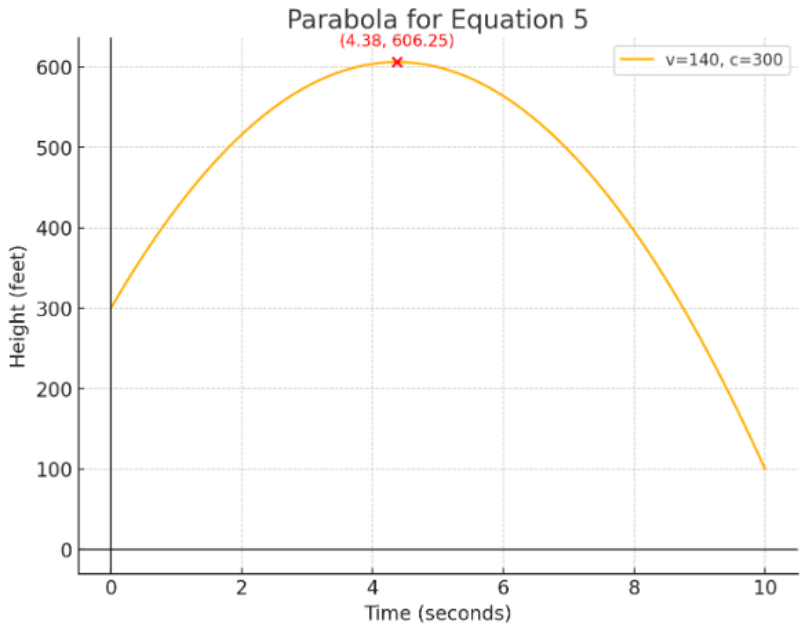
   $h = -16t^2 + vt + c$

   Where:

   - $v = 140$ feet per second
   - $c = 300$ feet

   To find the time to reach the maximum height:

$$h = -16t^2 + 140t + 300 \quad or\ graph\ the\ equation \quad \boldsymbol{y = -16t^2 + 140t + 300}$$



Answer:

At **4.375 seconds**, the object's maximum height will be **606.25 feet.**