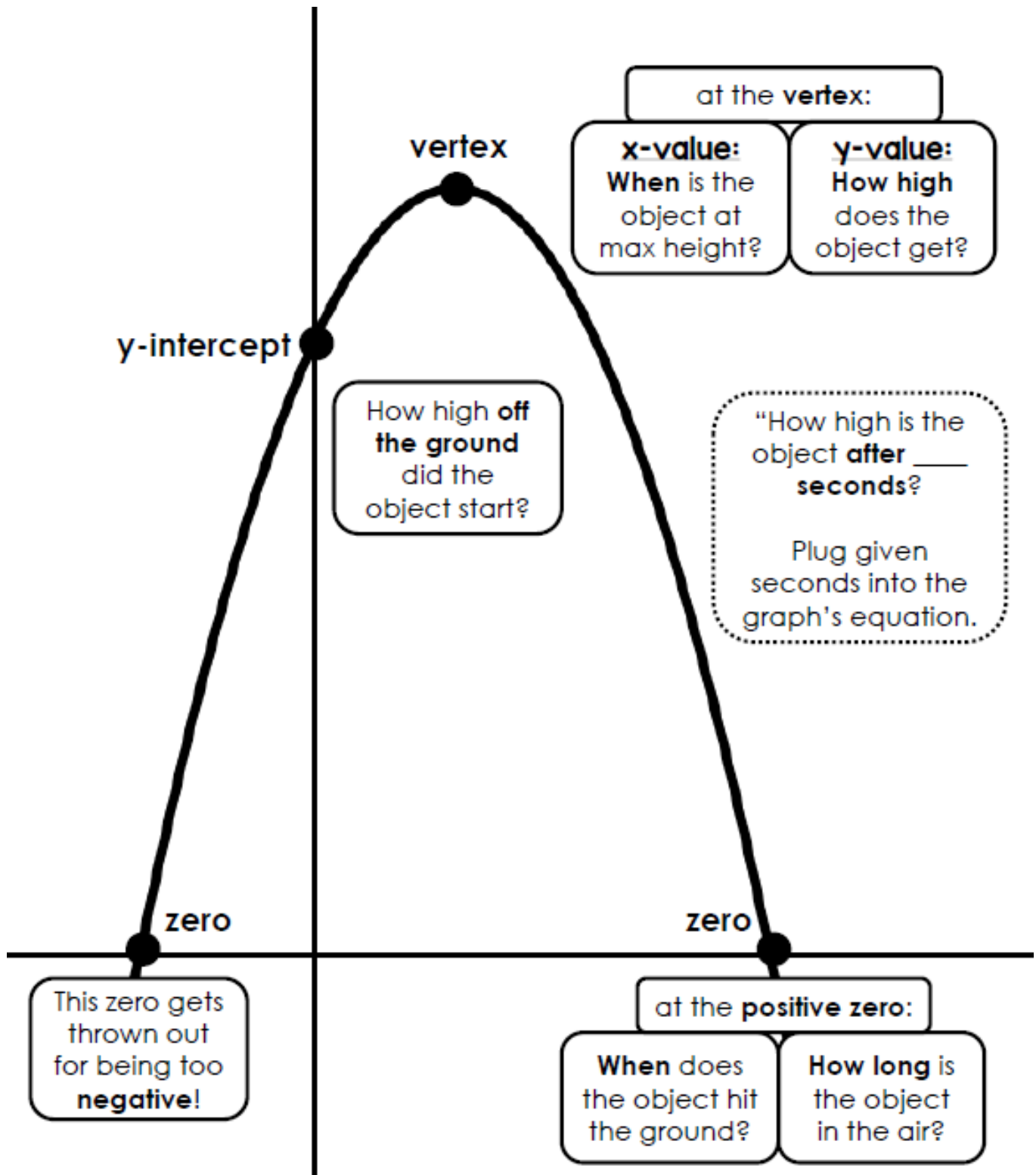
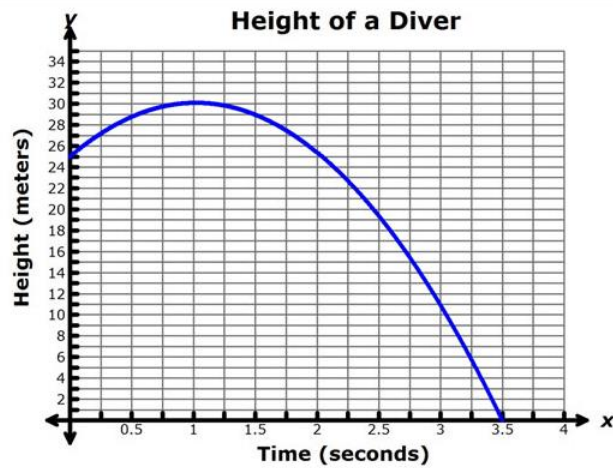


Quadratic Keywords
from *scaffoldedmath.com*



Applications of Quadratic Functions

1) This graph represents the height of a diver above the water vs. the time after the diver jumps from a springboard. Answer the following questions based on the information.



a) How long did it take the diver to hit the water?

b) How tall was the diving board?

c) What was the maximum height reached by the diver?

But what do we do if the graph isn't given to us? If we are not given a graph, we will be given the equation that represents the scenario.

You will need to determine whether the problem is asking you to find the vertex, the x-intercept(s), or the y-intercept.

► Vertex: maximum, minimum, highest, lowest

Vertex form: $y = a(x - h)^2 + k \rightarrow$ vertex at (h, k)

Standard form: $y = ax^2 + bx + c \rightarrow$ x-value of vertex found using $x = \frac{-b}{2a}$ and then plug that in to find y-value

► X-Intercept: ending, landing, ground level, sea level

Solve by: factoring, compl. the square, taking square roots, quadratic formula

► Y-Intercept: starting value

Plug in 0 for x in the given equation

2) An object is launched from a platform. Its height (in meters), x seconds after the launch, is modeled by: $h(x) = -5x^2 + 20x + 60$. What is the height of the object at the time of launch?

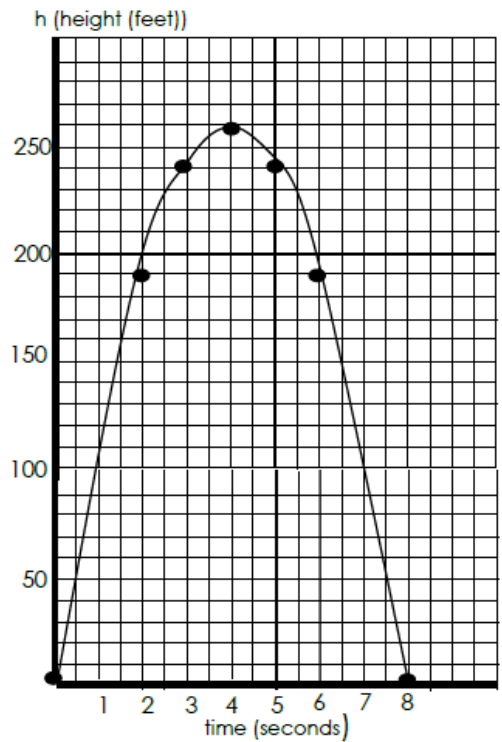
3) The height, h , in feet of an object above the ground is given by $h = -16t^2 + 64t + 190$, $t \geq 0$, where t is the time in seconds.

a) Find the time it takes the object to strike the ground.

b) Find the maximum height of the object.

Applications of Quadratic Functions Practice

1) Using the graph at the right, it shows the height, h , in feet of a small rocket t seconds after it is launched. The path of the rocket is given by the equation $h = -16t^2 + 128t$.



- How long is the rocket in the air?
- What is the greatest height that the rocket reaches?
- About how high is the rocket after 1 second?
- After 2 seconds, how high is the rocket? Is it going up or going down?
- After 6 seconds, how high is the rocket? Is it going up or going down?
- What is the average speed between $t = 0$ seconds and $t = 2$ seconds.
- Using the equation, find the exact height of the rocket at 6.5 seconds.
- What is the domain of the graph?
- What is the range of the graph?
- Identify the vertex.
- Identify the axis of symmetry.

Quadratic Formula Word Problems

1) Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function $h(t) = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.

a. How long did it take for Jason to reach his maximum height?

b. What was the highest point that Jason reached?

c. Jason hit the water after how many seconds?

2) If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation $h(t) = -16t^2 + 218t$ (if air resistance is neglected).

a. How long will it take for the rocket to return to the ground?

b. After how many seconds will the rocket be 112 feet above the ground?

c. How long will it take the rocket to hit its maximum height?

d. What is the maximum height?

3) A rocket is launched from atop a 101 – foot cliff with an initial velocity of 116 ft/s. It's height is represented by the quadratic equation $y = -16x^2 + 116x + 101$, where x represents the amount of time since launch in seconds and y represents the height of the rocket in feet.

Use the quadratic formula to find out how long the rocket will take to hit the ground after it is launched. Round to the nearest tenth of a second.

4) A blue jay swoops down from the top of a 10m tree to chase away some house sparrows. The blue jay's path follows a parabolic path given by the function $h(t) = 2t^2 - 8t + 10$ where t is time in seconds and $h(t)$ is height in meters.

a) What is the blue jay's lowest height? When did the blue jay reach the lowest height?

b) What is the blue jay's starting height?

c) Does the blue jay ever touch the ground? If so, at what time?