

6. The valley between two mountains whose peaks touch the x-axis is $y = 40.4x^2 - 404x$, where x and y are measured in feet. How deep is the valley?

7. A football is kicked into the air. Its height, in meters, after t seconds is given by $h = -4.9(t - 2.4)^2 + 29$.

a. What is the maximum height of the ball?

b. How high was the ball after 2 seconds?

c. Was the ball still in the air after 5 seconds?

8. The equation for the motion of a projectile fired straight up at an initial velocity of 64 feet per second is $-16t^2 + 64t = h$, where h is the height in feet and t is the time in seconds. Find the time the projectile needs to reach its highest point. How high will it go and how long will it take?

9. A model for a company's revenue is $R = -15p^2 + 300p + 12,000$, where p is the price in dollars of the company's product. What price will maximize revenue? What will be the maximum revenue?

10. The profit from selling local ballet tickets depends on the ticket price. Using past receipts, we find that the profit can be modeled by the function $p = -15x^2 + 600x + 60$, where x is the price of each ticket. What is the ticket price that gives the maximum profit?

6. The photo shows the Verrazano-Narrows Bridge in New York, which has the longest span of any suspension bridge in the United States. A suspension of cable of the bridge forms a curve that resembles a parabola. The curve can be modeled with the function $y = 0.0001432(x - 2130)^2$, where x and y are measured in feet. The origin of the function's graph is at the base of one of the two towers that support the cable.



- a. How far apart are the towers?
- b. How tall are the towers?

A frog is about to hop from the bank of a creek. The path of the jump can be modeled by the equation $h(x) = -x^2 + 4x + 1$, where $h(x)$ is the frog's height above the water and x is the number of seconds since the frog jumped. A fly is cruising at a height of 5 feet above the water.

1. Can the frog catch the fly without jumping? How do you know?
2. Is the extrema a maximum or minimum? Why?
2. What is the vertex?
4. If the frog jumps to catch the fly, it is possible for the frog to catch the fly?
5. Graph the paths of the frog and fly.

