

1. A helicopter is flying at an elevation of 256 feet above the Columbia River when it releases a package. The equation $p(x) = -16x^2 + 256$ describes the height of the package $p(x)$, in feet, and the time x , in seconds.
 - a. Find the maximum height of the package
 - b. Find when the package hits the water
 - c. Draw a graph of the package's flight.

2. I'm trying to work on my long jump, so I go to the football field to practice. The equation $h(x) = \frac{-1}{5}x^2 + \frac{28}{5}x - \frac{187}{5}$ represents the height of my feet above the ground $h(x)$, in feet, and the horizontal distance from the endzone x , in yards.
 - a. Find the maximum height of the jump
 - b. Find when I am on the ground
 - c. Can I jump farther than 5 yards?

3. During the last snowstorm, I went down to the Hawthorne Bridge and threw off a snowball. The equation $s(x) = -16x^2 + 64x + 48$ describes the height of the snowball $s(x)$, in feet, and the time x , in seconds.
 - a. Find the maximum height of the snowball.
 - b. Find when it hits the water
 - c. Find when the snowball is 64 feet high.

4. I can mow a lawn in 30 minutes and Ms. Boubel can mow a lawn in 40 minutes. Working together, the equation $m(x) = \frac{x}{30} + \frac{x}{40}$ represents how many lawns we can mow, $m(x)$, in x minutes.
 - a. How long will it take for us to mow 1 lawn?
 - b. How long will it take to mow between 3 and 5 lawns?
 - c. How many lawns can we mow in 4 to 8 hours?

5. Manufacturers of ball bearings need them to be almost perfectly identical, otherwise they will not rotate smoothly. Ball bearings are in the shape of a sphere, so the volume of a ball bearing is $V(x) = \frac{4}{3} \pi x^3$, where $V(x)$ is the volume in mm^3 and x is the radius in mm.
- If the radius can be between 9 mm and 11 mm, what are the possible volumes?
 - If the possible volumes can be between 4100 mm^3 and 4300 mm^3 , what are the possible radii?
6. Some statisticians define an outlier as a value that is greater than 1.5 standard deviations away from the mean. IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.
- Write the range of IQ scores that are defined as outliers
 - Use an absolute value to write an inequality that describes the outliers.
7. A parabola has the equation $f(x) = x^2 + bx - 21$ and has a solution of $x = 7$ and $x = a$. Find the values of a and b .