

Example 4**Apply Quadratic Inequalities**

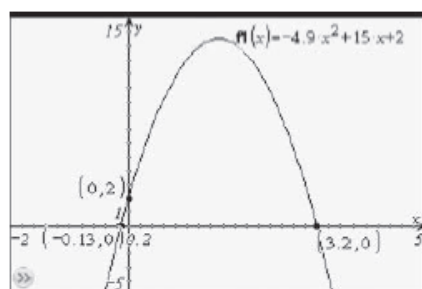
If a baseball is thrown at an initial speed of 15 m/s from a height of 2 m above the ground, the inequality $-4.9t^2 + 15t + 2 > 0$ models the time, t , in seconds, that the baseball is in flight. During what time interval is the baseball in flight?

Why is the quadratic expression greater than zero?

Solution

The baseball will be in flight from the time it is thrown until it lands on the ground.

Graph the corresponding quadratic function and determine the coordinates of the x -intercepts and the y -intercept.



Why is it useful to know the y -intercept of the graph in this case?

The graph of the function lies on or above the x -axis for values of x between approximately -0.13 and 3.2 , inclusive. However, you cannot have a negative time that the baseball will be in the air.

The solution set to the problem is $\{t \mid 0 < t < 3.2, t \in \mathbb{R}\}$. In other words, the baseball is in flight between 0 s and approximately 3.2 s after it is thrown.