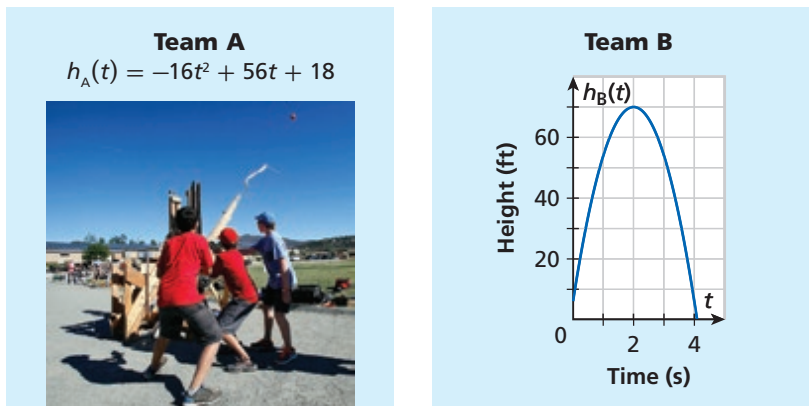


Student Activity

Project a Pumpkin: How Far Will It Go?

Two teams are launching pumpkins. The height h_A (in feet) of Team A's pumpkin is given by the equation shown, where t is the time (in seconds) since launch. The height of Team B's pumpkin is shown by the graph. How do the maximum height and time in air of the two teams' pumpkins compare?



Method 1 – Use the Given Representations

Team A: The function is quadratic. The maximum height occurs at its vertex. The vertex of a quadratic function $f(x) = ax^2 + bx + c$ occurs at $x = -\frac{b}{2a}$. For $h_A(t)$, $-\frac{b}{2a} = \frac{7}{4}$.

A. How was this value calculated?

$$h_A\left(\frac{7}{4}\right) = -16\left(\frac{7}{4}\right)^2 + 56\left(\frac{7}{4}\right) + 18 = -49 + 98 + 18 = 67$$

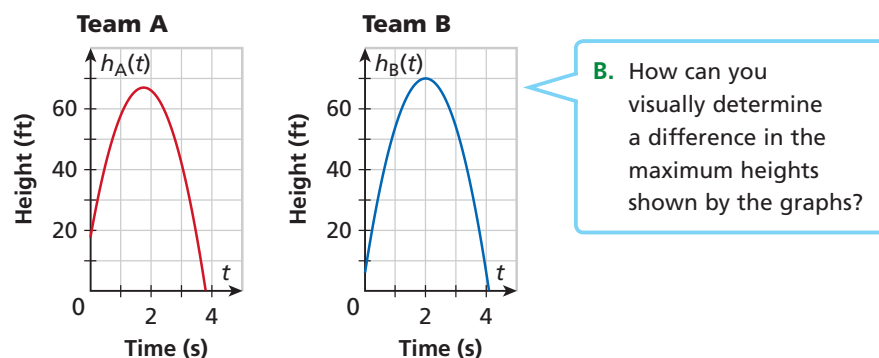
The maximum height reached by Team A's pumpkin is 67 feet.

Team B: Only an approximation of the maximum height can be made from the graph. The graph shows that the maximum height is approximately 70 feet.

Team B's pumpkin reaches a greater maximum height.

Method 2 – Use a Common Representation

The graph of function h_A can be created using its equation.



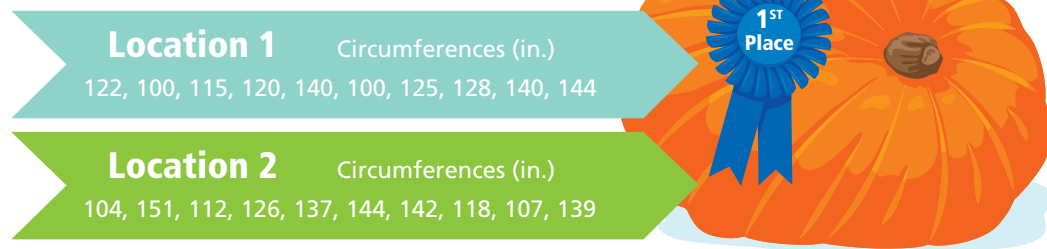
Turn and Talk

If the pumpkins are launched at the same time, how can you determine when the pumpkins reach the same height?

Student Activity

Pumpkin Measuring Contest

5. Listed are the circumferences, in inches, for prize-winning pumpkins in 2 locations over the past 10 years.



- Create histograms for the winning pumpkin circumferences in both locations.
- How are the distributions alike and how are they different?
- Which location has a greater mean circumference?
- Create box plots to compare the data sets.
- Which location has a greater median circumference?
- Which location has circumferences that are less spread out?