

Lesson Quadratic Applications

Problem Statement

The school garden needs to be re-fenced.

Constraints:

- FFA has 140 feet of fencing.
- FFA needs to enclose a 1000 square foot area.

What should the length and width of the fence be?

Sketch of the situation

Write equations relating information
on the sketch

Solve equation and Determine if
solutions make sense.

Problem Statement

The Community Garden needs to be fenced and the City wants the maximum area fenced with the amount of fencing that they have in the supply yard.

Constraints:

- It must be in the shape of a rectangle
- The supply yard has 500 feet of fencing that can be used

What should the length and width of the fence be to make the maximum area?

Sketch of the situation

Write equations relating information on the sketch

Use Desmos to graph the equation that we have for the area.

What is the maximum area?
What are the dimensions of the fenced area?

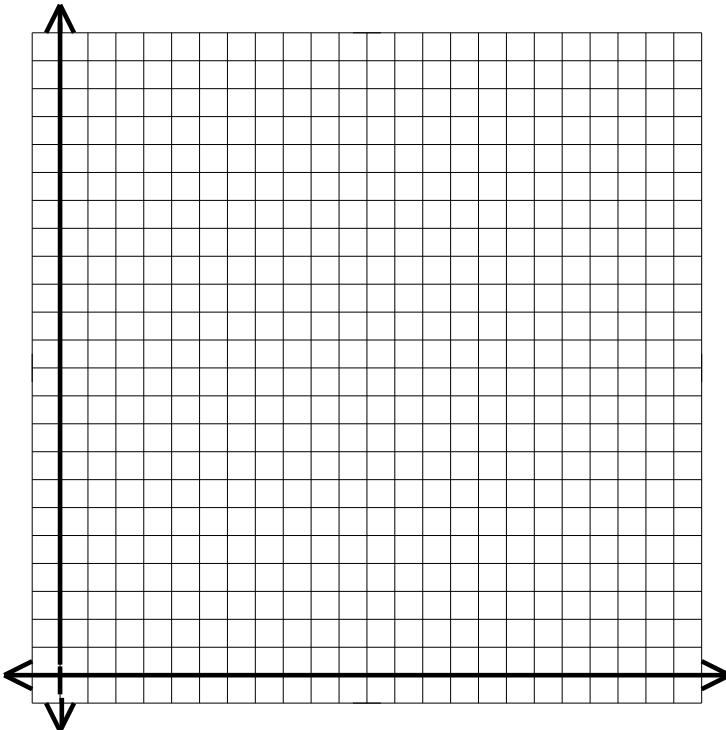
Example: The great Pumpkin Chuckin' contest happens in Wisconsin in October. In this competition, people build launching devices that will help their pumpkin fly the farthest. The current record is **4,694.68 feet**. The average pumpkin flight can be modeled by the function:
 $y = -.001x^2 + 2x$.

a. How long is the flight of the pumpkin?

b. How long did it take for the pumpkin to reach its maximum height?

c. What is that height?

d. Sketch a graph of the flight of the pumpkin.



Problem: Moe is playing with a yo-yo. He throws the yo-yo down and then pulls it back up. The motion of the yo-yo can be roughly modeled by the equation $y=2x^2-4.8x$, where x represents the number of seconds since the yo-yo left Moe's hand, and y represents the vertical height in feet of the yo-yo with respect to Moe's hand. Note that when the yo-yo is in Moe's hand, $y=0$, and when the yo-yo is below his hand, y is negative.

- a. How long is Moe's yo-yo out of his hand?

- b. Once the yo-yo leaves Moe's hand, how long does it take for the yo-yo to turn around, that is, to start its return to his hand? Use what you know about parabolas to help you.

- c. How long is the yo-yo's string? Assume that all the string has been let out when the yo-yo changes direction.

- d. Sketch a graph representing the motion of Moe's yo-yo. On the sketch, label the important points: when the yo-yo is in Moe's hand and when it changes direction.

