## Write

1. In your own words, explain the four steps of the mathematical modeling process.
   - Notice and Wonder
   - Organize and Mathematize
   - Predict and Analyze
   - Test and Interpret

Remember

Tables, graphs, and equations can be used to model situations. A function created by the product of two linear factors is a quadratic function.

Practice

1. Mr. Jones wants to fence in a rectangular field for his horse using the 600 feet of fence he has stored in his barn. He wants to maximize the area of the field in order to give his horse the most pasture possible. Help Mr. Jones design his field to achieve the maximum area.
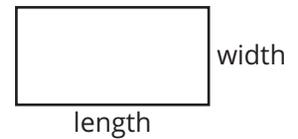
   a. Complete the table to show the length of the field for each given width.

 | Width (feet) | 0 | 50 | 100 | 150 | 200 | 250 | 300 |
   |---|---|---|---|---|---|---|---|
   | Length (feet) | | | | | | | |

   b. Define the function $l(w)$ to represent the length of the field as a function of the width. Explain your reasoning.

   c. Define the function $A(w)$ to represent the area of the field as a function of the width. Explain your reasoning.

   d. Determine the maximum area of the field as well as the length and width that will result in the maximum area. Explain your reasoning.

2. Ms. Williams wants to fence in a rectangular area of her field using the 1200 feet of fence she has. She wants the area to have four congruent sections. She is trying to decide which of the two designs shown will give her animals the maximum fenced area.
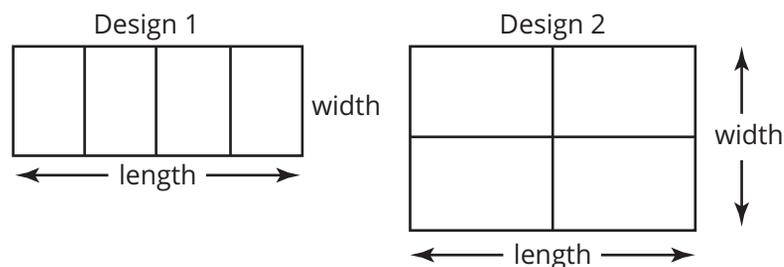
   Determine the design and the dimensions of the design that will give Ms. Williams the maximum fenced area. Show your work and explain your reasoning.

Stretch

1. A team of engineers is going to build a recreational field with a path around it. The field will be rectangular in shape with a semicircle at each end. The path will be 1320 feet long. Determine the dimensions for the length and width that will give the greatest possible area for the rectangular section of the field. Round your answers to the nearest tenth.
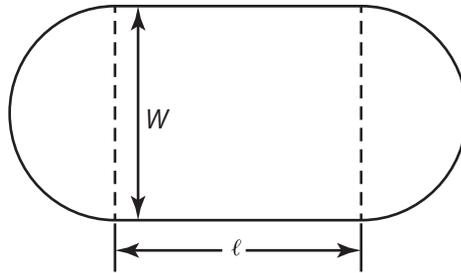
Review

1. Use properties to rewrite each expression.

   a. $(8 - 3i) - (8 + 3i)$

   b. $(8 - 3i)(8 + 3i)$

2. A baseball is hit from an initial height of 3 feet. The baseball reaches its maximum height of 81 feet when it is 156 feet from home plate.

   a. Write a quadratic function to represent the height of the baseball as a function of its distance from home plate.

   b. Determine the height of the baseball when it is 180 feet from home plate. Round your answer to the nearest tenth.

3. Solve the equation $7x^2 - 11x + 3 = 0$. Round your answer(s) to the nearest hundredth, if necessary.