Making the Most of It

Find the dimensions of at least eight different rectangular regions, each with perimeter 24 meters. You must use all of the fencing material for each garden.

Find the area of each garden. Make a table to record the width, length, and area of the possible gardens. It's okay to have widths that are greater than their corresponding lengths.

Width (m)	Length (m)	Area (m^2)

Enter the data for the possible widths into list L1. Enter the area measures into list L2. Which garden width values would give no area? Add these points to your lists.

Label a set of axes and plot points in the form (x, y), with x representing width in meters and y representing area in square meters. Describe as completely as possible what the graph looks like. Does it make sense to connect the points with a smooth curve?

Where does your graph reach its highest point? Which rectangular garden has the largest area? What are its dimensions?

Create a graph of (width, length) data. What is the length of the garden that has a width of 2 meters? Width 4.3 meters? Write an expression for length in terms of width x.

Using your expression for the length from the previous step, write an equation for the area of the garden. Enter this equation into Y1 and graph it. Does the graph confirm your answer for the size of the rectangle with the largest area?

Locate the points where the graph crosses the x-axis. What is the real-world meaning for these points?

Do you think the general shape of a garden with maximum area would change for different perimeters? Explain your answer.

The two points on the x-axis are the x-intercepts. The x-values of those points are the solutions to the equation $y=f(x)$ when the function value is equal to zero. These solutions are the roots of the equation $f(x)=0$.