The Maximum Area Problem

A farmer has the task of fencing a rectangular pen for his dog, Canadian. He has 60 m of fencing for the job and wants to build a pen of maximum area. Determine the length and width of the rectangular dog pen and its maximum area.

Open the Fence Problem tns file.

Observations
In this activity you will use a moveable rectangle to determine the dimensions of a rectangle that produce the largest possible area.

On page 1.3, drag the point B to change the dimensions of the rectangle.
Complete the following chart for the length, width, perimeter and area of four different locations of point B.

Length	Width	Perimeter	Area

What is the affect on the perimeter as you drag point B?

What is the affect on the area as the length increases?

What happens to the area as the length decreases?

What conclusions about the area can you draw from your observations?

Calculations

In the next part of this activity you are going to manually collect data on the length, width, area and perimeter in a spreadsheet and make observations based on this data.

Drag Point B to various locations to make different sized rectangles (at least 10). Press ⌨ ⌨ keys to transfer the data into the spreadsheet.

The scatterplot is a graph of the relation of area verses length for the rectangle.
What type of function is modelled by the scatterplot?

Determine the regression equation that best represents this data.
Insert a new Graphs and Geometry page and graph the regression equation. Change the window settings to display the vertex and the intercepts of the parabola.

Use the trace feature to determine the coordinates of the maximum of the parabola.

What is the length of the rectangular pen that produces the maximum area?

What is the width of the rectangular pen that produces the maximum area?

What is the maximum area?