CHAPTER 9: Optimizing Measurements
9.1 Investigate Measurement Concepts
Investigate Measurement Concepts

Use the problem-solving process to conduct an investigation: understand the problem, choose a strategy, record the results, and draw conclusions.
Rectangles with the same perimeter can have different dimensions and contain different areas.
Rectangles with the same area can have different dimensions and different perimeters.

Example: Constantinos has 16 fence posts. They will be placed 3 m apart to fence off a rectangular area.
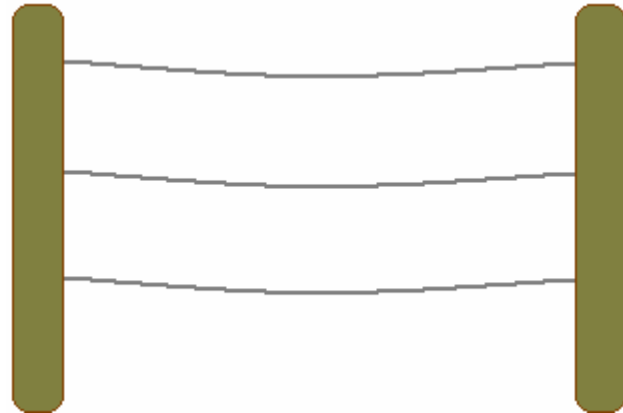
a) One possible arrangement has 6 posts along one side of the rectangle. Find the area that would be fenced in.

b) What arrangement of posts would fence in the maximum area?

Solution:

a) Use pencil and paper, a geoboard, dynamic geometry software, or other aid to make a model of the fencing.

$A = lw$

   $= 15 \times 9$
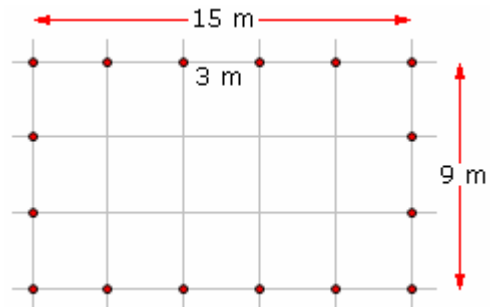
   $= 135$ m^2

The fence encloses an area of 135 m^2.

b) Use a table, spreadsheet, or other aid to tabulate the possible arrangements of posts, and the corresponding areas enclosed.

Number of Posts Along the Length	Number of Posts Along the Width	Length (m)	Width (m)	Area (m²)
8	2	21	3	63
7	3	18	6	108
6	4	15	9	135
5	5	12	12	144
4	6	9	15	135
3	7	6	18	108
2	8	3	21	63

The maximum area that can be enclosed is 144 m^2, using 5 posts along each side.

Practice:

1. a) Constantinos found that termites had bored into 2 of his fence posts, making them unusable. Find the area that he can enclose with the remaining posts, using 6 posts along the length.

b) Find the pattern that encloses the maximum area.

Answers:

1. a) 90 m^2 b) 108 m^2 using 5 posts by 4 posts