



## 9.A Geoboard Distances

You will need:

- geoboards 
- dot paper 

1. Find the distance between the origin and each geoboard peg. Use radical expressions for your answers, not decimal approximations. Arrange your results in a table like the one below, with the peg coordinates along the sides. In each space write the peg's distance from the origin. Some examples have been entered to get you started. To speed this up, work with a partner and look for patterns.

10											
9											
8											
7											
6											
5	5										
4			5								
3				5							
2	$\sqrt{5}$										
1		$\sqrt{5}$									
0					5						
	0	1	2	3	4	5	6	7	8	9	10

2. Describe the patterns you see in the table.

- Find the numbers in the table that are not in simple radical form. Put them in that form and describe the patterns you notice.
- What is the distance from the origin to the furthest peg on a geoboard having dimensions
  - 20 by 20?
  - $n$  by  $n$ ?
  - 20 by 30?
  - $m$  by  $n$ ?
- On a 20-by-20 geoboard, what would be the largest multiple of:
  - $\sqrt{2}$ ?
  - $\sqrt{5}$ ?
  - $\sqrt{10}$ ?
- Notice that all the multiples of  $\sqrt{2}$  lie on a line. What is the slope of this line?
- Why are there two lines containing multiples of  $\sqrt{5}$ ?
  - What are the slopes of these lines?
- Repeat problem 7(b) for multiples of:
  - $\sqrt{10}$ ;
  - $\sqrt{17}$ .
- List the geoboard distances that are on the line through the origin having slope
  - 5;
  - $3/4$ .
- Report** Summarize your results from this lesson. Describe and explain the patterns you noticed and the generalizations you made.