



Geometry on the Geoboard

Concept(s): Area - polygons

TEKS: **Congruence and the Geometry of Size:** The student extends measurement concepts to find area, perimeter, and volume in problem situations

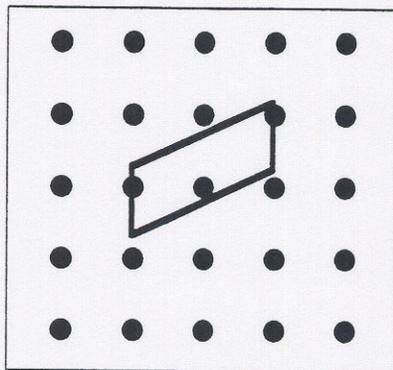
The student finds areas of regular polygons and composite figures.

The student develops, extends, and uses the Pythagorean Theorem.

Materials: Activity Sheet 3.1 pp. 90-93, 3.2 (extension) p. 94
Geoboards

Notes: Area on the Geoboard

Procedure: Using the overhead geoboard, review with the students the method of finding area using rectangles and diagonals. Pass out the student geoboards and have each student form the following figure on their geoboard.



With this method a figure is divided into rectangles and the area of each section of the polygon is found by using the diagonals of the rectangles and adding or subtracting areas. In the given example the area is 2 square units.

Pass out the Activity Sheet 3.1. Have students build the first polygon on their geoboard. Have a student volunteer to demonstrate how he found the area of the first figure from the activity sheet on the overhead geoboard. Did someone do it differently? Would he demonstrate his method for the class. Students should record the area and the process used on the Activity Sheet.

After the students seem confident in finding area using the rectangular box method ask them to find at least 3 different ways to determine the area of each polygon on the activity sheet. After fifteen minutes pair them with another student and have them compare results.

Ask the students to tell what method they used to determine the areas of the given shapes. Did they use a formula? Did they use a counting method? Try to find an alternative method.



Extension: Using the given figures in Activity 3.1 as a starting point, determine the relationship between interior and exterior points and the resulting area. Activity 3.2 (extension) has provided some of the figures with no interior points. Have the students develop other polygons on the geoboard with two interior points and three interior points. Can they determine the relationship between the area of the polygons and the interior and boundary points? Have them verify their formula by using the figures in Activity 3.1 to check and compare the areas. Pick's Theorem is $A = \frac{b}{2} + i - 1$ where b represents the boundary points and i represents the interior.



Geometry on the Geoboard

Activity 3.1 Key

Area = 6
Area = 2
Area = 5.5
Area = 8
Area = 2
Area = 8
Area = 6
Area = 8
Area = 1
Area = 5.5
Area = 4.5
Area = 2.5
Area = 7.5
Area = 14
Area = 4
Area = 4



Activity 3.1

	Process	Area
1		
2		
3		
4		



Activity 3.1

	Process	Area
5		
6		
7		
8		



Activity 3.1

	Process	Área
9		
10		
11		
12		



Activity 3.1

	Process	Area
13		
14		
15		
16		



Activity 3.2 (extension)

	Process	Area
1		
2		
3		
4		