Pick's Theorem

Discovering Pick's Theorem

Task 1: Explore the patterns involving area of shapes on the geoboard with 0 pegs inside a polygon. Collect data for this table:

# of pegs on the boundary	3	4	5	6	7
Area					

It is possible to determine area of a polygon with 0 pegs inside the polygon if you know the number of pegs touching the boundary. If a shape has 12 pegs touching the boundary and 0 pegs inside, what is its area? Use patterns in the table to determine the area. Describe the patterns.

Write a rule to show the relationship between the number of pegs touching the boundary and area when there are 0 pegs inside:

Area =_____

Test out your rule for all the number pairs in the table.

Use the rule to determine the area of a shape with 17 pegs touching the boundary with 0 pegs inside.

Task 2: Continue with your explorations. Vary the number of pegs inside the figure to see how the relationship between area and pegs touching the boundary changes.

1 peg inside

# of pegs on boundary	Area

2 pegs inside

# of pegs on boundary	Area

3 pegs inside

# of pegs on boundary	Area

Describe patterns observed in each table.

What would the area be if there were 12 pegs on the boundary and 1, 2 and then 3 pegs inside?

Write a rule to explain the relationship between area and pegs on the boundary for each case above.

EXTENSION: Pick's theorem explains the relationship among 3 variables: Number of pegs on the boundary, Number of pegs inside the figure and area.

Let A = area **Let B = Pegs on the boundary** **Let I = Pegs inside**

Write a rule that can be used to find the area of a shape on the geoboard given "B" pegs on the boundary and "I" pegs inside the boundary.

Test out your rule with data from the four tables.

Explain how you thought through this problem.