

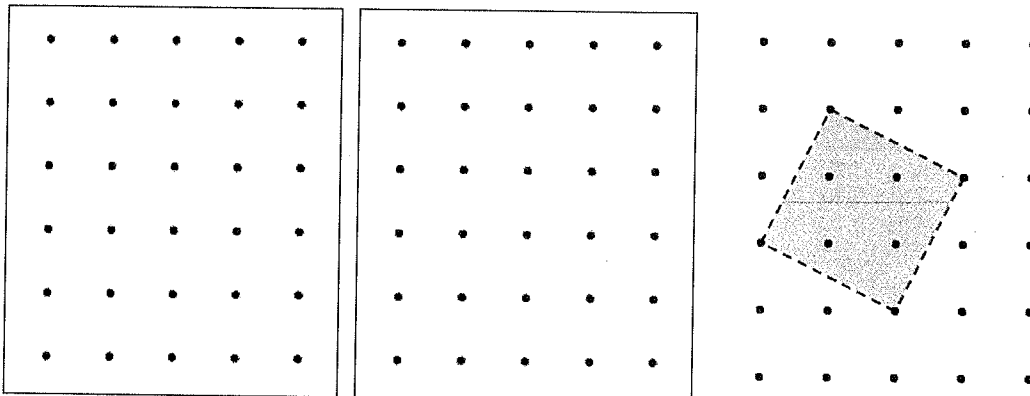
# The Shrinking Square

## Launch

These two activities review area and radicals to launch this task and assess student readiness.

### Part A

Given a 5 by 6 geoboard or geodot paper, comprised of 30 pegs, as shown, your task is to determine how many different sized squares can be created by connecting 4 pegs. Note that some squares, as shown below, will be "slanted" squares.



For each square you find, determine its area in square units.

### Part B

Look at each row in the table below and explain whether or not the expression and the simplified expression are equivalent. Be sure to justify your answers.

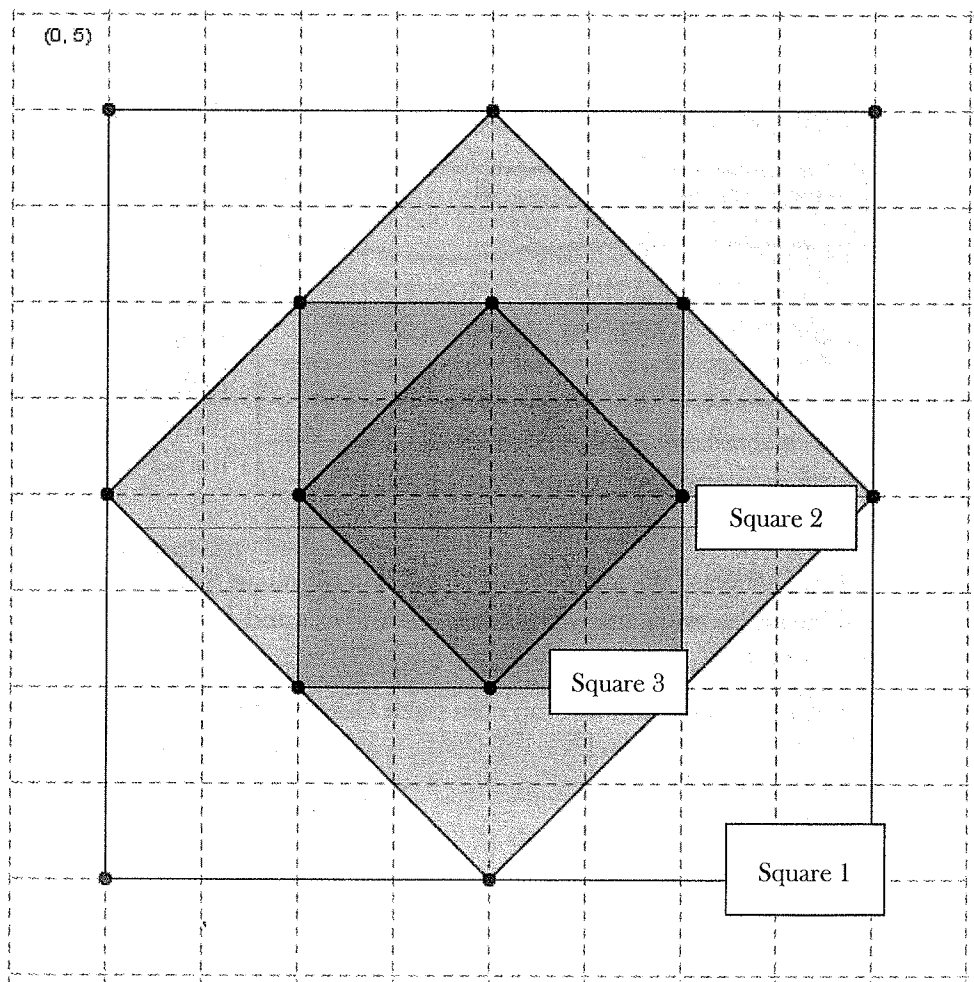
Expression	Simplified Expression
$\sqrt{25}$	5
$\sqrt{7^2}$	7
$2\sqrt{3} \cdot 5\sqrt{3}$	30
$\sqrt{18}$	$3\sqrt{2}$
$\sqrt{6^3}$	$6\sqrt{6}$

# The Shrinking Square

## Activity

The design below started with an 8 unit x 8 unit square and was continued by constructing a series of smaller nested squares by connecting the midpoints of the sides of each square.

1. Continue this drawing for the next two smaller squares.
2. Construct a table showing the square number, the side length, and the area for the first six squares in this drawing.
3. If a side length of the original square is  $x$ , what is the side length of the  $n$ th square in this pattern? Justify your answer.
4. If the area of the original square is  $A$ , what is the area of the  $n$ th square in this pattern? Justify your answer.



5. Now start with a rectangle that is 12 cm by 8 cm. Follow the same process of finding the midpoints and creating successively smaller quadrilaterals. Create a table of values for length, width, and area of each of these shapes, and generalize your results for the dimensions and the area. Then compare the findings for the rectangle with those of the square.