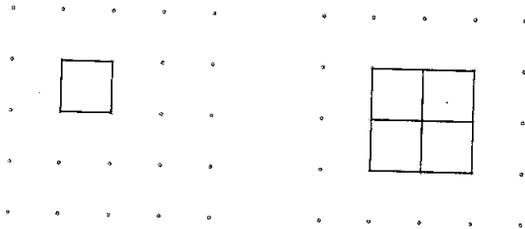


Looking for Squares

Name: _____

The smallest square you can draw by connecting the dots on a 5 dot-by-5 dot grid is a unit square, which has an area of 1 square unit. You can draw a 2-by-2 square by connecting the dots as shown. Since a 2-by-2 square contains 4 unit squares, it has an area of 4 square units.



A unit square has an area of 1 square unit.

A 2-by-2 square has an area of 4 square units.

Your task for today is to explore the other areas that are possible for squares drawn on a 5-by-5 dot grid.

A. Using the grids provided, draw squares of various sizes by connecting dots. Try to draw squares with as many different areas as possible. Label each square with its area.

When you are done finding squares,

Take it further:

1. We will call squares with vertical and horizontal sides "upright" squares. Which of the squares you drew are upright squares? Identify each square by giving its area.
2. We will call squares with sides that are not vertical and horizontal "tilted" squares. Which of the squares you drew are tilted squares? Identify each square by giving its area.
3. For which kind of square - upright or tilted - is it easier to find the length of a side? Explain why.

The area of a square is the length of a side multiplied by itself. This can be expressed by the formula $A = s \times s$, or $A = s^2$. If you know the area of a square, you can work backward to find the length of a side. For example, suppose a square has an area of a 4 square units. To find the length of a side, you need to figure out what positive number multiplied by itself equals 4. Since $2 \times 2 = 4$, the side length is 2 units. We call 2 a **square root** of 4.

In general, if $A = s^2$, then s is called a *square root* of A . Since $2 \times 2 = 4$ and $-2 \times -2 = 4$, 2 and -2 are both square roots of 4. Every positive number has two square roots. The symbol for the positive square root is $\sqrt{\quad}$. We write $\sqrt{4} = 2$. The negative square root of 4 is $-\sqrt{4} = -2$.

4a. What is the value of $\sqrt{1}$?

4b. What is the value of $\sqrt{9}$?

4c. What is the value of $\sqrt{16}$?

4d. What is the value of $\sqrt{25}$?

5a. Is $\sqrt{2}$ greater than 1? Is $\sqrt{2}$ greater than 2? Explain your reasoning.

5b. The side length of a square with an area of 2 square units is $\sqrt{2}$ units. In this problem, you drew a square with an area of 2 square units. Use a centimeter ruler to find the side length of this square. You made your drawings on centimeter dot grids, so 1 cm = 1 unit.

5c. Use the square root button on your calculator to find $\sqrt{2}$. How does the answer compare to your answer to 5b?