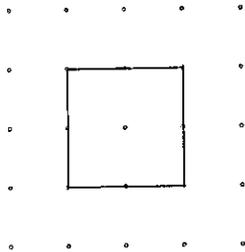


# Finding Lengths

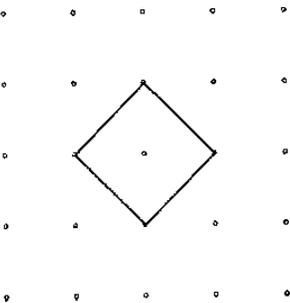
Name: \_\_\_\_\_

We found and drew squares on a 5x5 grid. Some of the squares were upright and others were tilted. You learned that a positive square root of a number is the side length of a square with that number as its area. For example,  $\sqrt{4} = 2$  because the square with an area of 4 square units has sides of length 2.



This square has an area of 4 square units. The length of a side is  $\sqrt{4}$ , or 2.

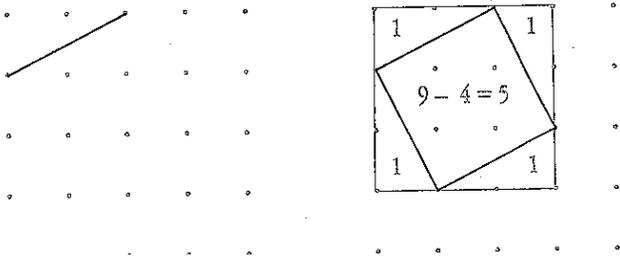
Sometimes a square root is not a whole number. For example,  $\sqrt{2}$  is approximately 1.414. When a square root is not a whole number, we sometimes write it by using the  $\sqrt{\quad}$  symbol rather than finding a decimal approximation.



This square has an area of 2 square units. The length of a side is  $\sqrt{2}$ .

You can use a square to find the length of a line segment connecting dots on a grid. Just draw a square with the line segment as one side. The length of the segment is the square root of the square's area.

For example, to find the length of the line segment below, draw a square with the segment as one side. The square has an area of 5 square units, so the segment has a length of  $\sqrt{5}$ .

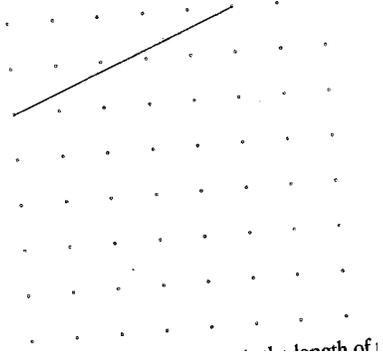


A. On the 5-by-5 dot grids on Labsheet 2.3, draw line segments of various lengths by connecting the dots. Try to draw segments with as many different lengths as possible. Use the method described above to find the length of each segment. To find some of the lengths, you will need to draw squares that extend beyond the 5 by 5 dot grids. Label each segment with its length. Use the  $\sqrt{\quad}$  symbol to express lengths that are not whole numbers.

B. 1) Estimate each length that is not a whole number by measuring the segment with a centimeter ruler. Record your answers on Labsheet 2.3

2) Use your calculator to express each length that is not a whole number as a decimal to the thousandths place. Record your answers on Labsheet 2.3

C. Express the length of the line segment below by using the  $\sqrt{\quad}$  symbol.



D. Between what two consecutive whole numbers is the length of the line segment in part C?