Square Roots

6680

Introduction

In this activity, students develop an understanding of the relationship between a number and its square root.

Grades 6-8

NCTM Number and Operations Standards

- Understand meanings of operations and how they relate to one another
- Understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems

Files/Materials Needed

Square1.act, Square2.act, Number Line.act

PART 1 A VISUAL RELATIONSHIP BETWEEN A NUMBER AND ITS SQUARE ROOT

1

a. Launch TI-Navigator™ on the computer and start the session.

**b.** Have each student log into NavNet on their calculator.

2

a. Load the ***Square1.act*** activity settings file into Activity Center.

b. Explain to students that the numbers shown inside each of the six squares represent the area of that square. Ask them to determine the length of the side of each square, and collect the answers using **Quick Poll**.

c. Tell students that the numbers representing each area are considered perfect squares, and that each side length represents the corresponding square root of that number. Explain that numbers are considered perfect squares if their square roots are natural numbers (whole numbers greater than or equal to 1).

3

a. Now load the ***Square2.act*** activity settings file into Activity Center.

b. Explain to students that, once again, the numbers contained within each square represent the area of that square. As with the previous activity, the lengths of the sides of each square represent the square root of that number.

c. Using **Quick Poll**, ask students to estimate the lengths of the sides of the squares whose areas are 5 and 20. Review the results.

d. Refer to the square with area 10 to show that the estimate of the square root of 10 is slightly greater than 3.

- If students are familiar with right triangles, explain that the side of the square can be thought of as the hypotenuse of a right triangle with legs of lengths 1 and 3. Because the
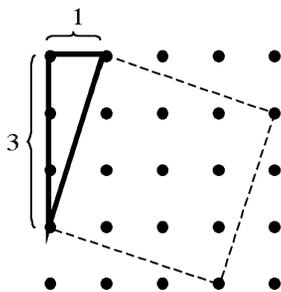
hypotenuse is the longest side of a right triangle, its length must be slightly greater than 3.

- Also point out that $3 \cdot 3 = 9$ and $4 \cdot 4 = 16$, so the square root of 10 must be a number that lies between 3 and 4. Tell students that every nonnegative number has a square root, and sometimes those square roots are not whole numbers.

e. Using **Quick Poll**, ask students to estimate the lengths of the sides of the squares whose areas are 34 and 2. Then have students exit Navnet and find the actual square roots of these numbers.

PART 2 ESTIMATING THE LOCATION OF THE SQUARE ROOT OF A NUMBER

4

a. Load the *Number Line.act* activity settings file into Activity Center.
b. Start the activity and call out a whole number (not a perfect square) whose square root is between 0 and 16. Instruct students to move their cursor to its approximate location on the number line and mark the point.
c. Have students send their point and discuss the results. Repeat the activity with several different numbers to allow students time to master this important skill.