

# Square Roots

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**Strand:** Number and Number Sense

**Topic:** Determining Square Roots

**Primary 2023 SOL:** **7.NS.3ab The student will recognize and describe the relationship between square roots and perfect squares.**

- a) Determine the positive square root of a perfect square from 0 to 400.\*
- b) Describe the relationship between square roots and perfect squares.\*

## Materials

- Square Roots activity sheet (attached)
- Calculator
- Square Tiles

## Vocabulary

*exponent, perfect square, square, integer, inverse operation (earlier grades)  
square root, radical, radical symbol ( $\sqrt{\quad}$ )*

## Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Distribute the Square Roots activity sheet, and have the students construct squares (e.g.,  $1 \times 1$ ,  $2 \times 2$ , etc.) using the square tiles. The number of tiles used to build the square is the area of the square. Students should complete the chart.
2. Explain to students that the square root of a number can be represented geometrically as the length of a side of a square. The connection between square roots and perfect squares can be made by investigating side lengths and areas of geometric squares using arrays, grid paper, square tiles, etc. Help students make these connections as they complete the chart.
3. Ask students, “Why do you think these numbers are called perfect squares?” Explain to students that a perfect square is a whole number whose square root is an integer (e.g.,  $36 = 6 \cdot 6 = 6^2$ ).
4. Explain that the square root of a number is a number which, when multiplied by itself, produces the given number (e.g.,  $\sqrt{121}$  is 11 since  $11 \cdot 11 = 121$ ). The completed chart on the activity sheet displays perfect squares from 0 – 400.
5. Give students some additional perfect squares and ask them to determine the square root.

## Assessment

- **Questions**
  - How can you create a definition for a perfect square, using tiles?
  - What is a square root?
  - What is a perfect square?
  - What is the relationship between a square root and a perfect square?
  - Which number does not belong: 81, 99, 100, or 121? Why?

- **Journal/writing prompts**
  - Explain the difference between finding the square root and squaring a number.
  - Explain to a friend how to recognize a square root and a perfect square.
  - Explain to a friend how to find the square root of a number.
  - Explain whether every number has a square root that is an integer.
  - Explain the definition of the symbol  $\sqrt{\quad}$ .
- **Other Assessments (include informal assessment ideas)**
  - Have students create a foldable for square roots and perfect squares.
  - Create an exit ticket about square roots for students to complete. Develop the questions based on the level of the student.

**Extensions and Connections (for all students)**

- Have students continue the Square Roots activity sheet to find all the perfect squares through 1,000.
- Have students make an analog clock using the square roots of perfect squares (1–144).

**Strategies for Differentiation**

- Use a hundreds chart to identify perfect squares by putting a square around each number.
- Have students shade squares on graph paper instead of using square tiles.
- Provide more examples other than lines 1 and 2 on the Square Roots activity sheet.
- Have students draw representations of perfect squares on grid paper and identify their corresponding square root.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

