

# Exponential Expressions-Perfect Squares, Square Roots

## Summary

Identify and find the value of a perfect square. Find the square root of a perfect square.

## Main Core Tie

Mathematics Grade 6

[Strand: EXPRESSIONS AND EQUATIONS \(6.EE\) Standard 6.EE.1](#)

## Additional Core Ties

Mathematics Grade 8

[Strand: EXPRESSIONS AND EQUATIONS \(8.EE\) Standard 8.EE.2](#)

## Materials

Student calculators

50 Color Tiles for each pair or team

Foldable (attached) for each student: "[Perfect Squares and Square Roots](#)"

Worksheets: "[Adding, Multiplying and Squaring Base Numbers](#)", "[Building Squares and Square Roots with Color Tiles](#)"

## Background for Teachers

Enduring Understanding (Big Ideas):

Exponential numbers

Essential Questions:

How do  $2n$  and  $n^2$  differ?

What is the value of  $n^2$ ? Of  $n^2$ ?

What is the relationship between a number squared and the square root of a number?

Skill Focus:

Find the value for perfect squares and square roots Explain the relationship. between a perfect square and its principle root.

Vocabulary Focus:

power, base, exponent, exponential expression, a number squared, square root, inverse relationship

Ways to Gain/Maintain Attention (Primacy):

Cooperative learning, manipulatives, recognizing patterns, Foldable Notes, making predictions.

## Instructional Procedures

Starter:

Use prime factorization to find the GCF and the LCM for 9 and 12.

Find the value for each of the following:

$$3 \times 3$$

$$3 + 3$$

$$2 \times 3$$

$$6 \times 6$$

$$6 + 6$$

$$2 \times 6$$

Discuss the starter

Lesson Segment 1: How do  $2n$  and  $n^2$  differ?

Briefly review with students how to write a base number and an exponent. Students have used this

notation since 5th grade. Show students how to use the  $\frac{\square}{\square}$  key on a Ti-73 to write an exponential expression. Students will work in pairs to find a pattern value for the expressions using the " [Adding, Multiplying and Squaring Numbers](#)" (attached). Partners alternate roles with each problem having one partner being the *Predictor* and the other being the *Checker*. The predictor says what he/she believes the answer will be. The checker uses a calculator or pencil/paper to check. Both record on their own worksheets.

Lesson Segment 2: What is the relationship between  $n^2$  and  $n^2$ ?

Use " [Building A Square Patio](#)" (attached), an investigation with Color Tiles to help students visualize the inverse relationship between squaring a number and taking the square root of that perfect square. Student pairs or teams can build each patio using the Color Tiles. Discuss each step as a class focusing on the relationship between the side length and the root, between the square and total tiles, and between the root and the square.

Lesson Segment 3: What is the value of  $n^2$ ? Of  $n^2$  ?

Journal: [A foldable is attached](#) (front and back). Give each student a foldable. Holding the paper vertically, fold the paper on the dotted lines. Students should complete the foldable.

Do Pairs Compare at each team, where each person exchanges their foldable with a partner to check. After checking the pair should discuss how their answers and explanations are similar or how they differ.

Assign text practice as appropriate.

#### Assessment Plan

Journal, observation, performance task.

#### Bibliography

This lesson plan was created by Linda Bolin.

#### Authors

[Utah LessonPlans](#)