

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 $\sqrt{n^2}$?

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 $\sqrt{n^2}$?

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

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