2.4 Determining Square Roots of Rational Numbers

Explore Square Roots of Rational Numbers

The following notes provide guidelines to help you adapt the Explore Square Roots of Rational Numbers section from *MathLinks 9*.

- Discuss the Literacy Link about square roots. List square roots and perfect squares to help students understand how these two concepts are related.
- Show students examples illustrating perfect squares and square roots using grids. More examples will help students visualize the relationships between length, area, squares, and square roots.
- Use the Warm Up to review squares and square roots. Remind students that 3^2 means 3×3, *not* 3×2.
- Distribute **BLM 2–8 Section 2.4 Explore Square Roots of Rational Numbers** to assist students with #1c), #2a), and #2d).
- Distribute **Master 9 0.5 Centimetre Grid Paper** to use for #1b) and #2b). Students may benefit from doing #2d) as a whole-class discussion.

Examples

Working Example 1:

- Remind students that the square and square root functions are directly related to the shape of a square, and that the square root is the length of one side of a square.

Working Example 2:

- Emphasize that when both the numerator and denominator are perfect squares, the fraction is also a perfect square.

Working Example 3:

- Stress to students that there are often several ways to do a question correctly, and that they can use the method that they prefer.

Working Example 4:

- Post a list of perfect squares and square roots. For example, $1^2 = 1$, $2^2 = 4$, $3^2 = 9$, … and $\sqrt{1} = 1$, $\sqrt{4} = 2$, $\sqrt{9} = 3$, ….

Communicate the Ideas, Practise, and Apply

- Review common language interpretations with students. For example, the square root asks the question "What number times itself equals 4?"
- Check students' answers to #2 to help you assess their understanding of square roots of decimal numbers.
- Use #10 to help students understand the difference between area and volume. Discuss the relationship of 1 L of paint covering 9 m^2, 2 L covering 18 m^2, etc.
- Students may benefit from discussing and doing the Apply questions in pairs.
- Provide students who need additional practice with **BLM 2–9 Section 2.4 Extra Practice**.

Math Link

- This exercise will help students review the key ideas of length and area. Encourage students to think about length and area in terms of a room. The length of the perimeter can be represented by the length of the floorboards or tiles, and the area can be represented by the amount of carpeting. Use your classroom as an example if appropriate.

Common Errors

- Students often confuse taking the square root of a number with dividing by 2.

$\mathbf{R}_x$ Review that the square root of 16 is 4, while $16 \div 2 = 8$.