

Date:

Title:

(A) Lesson Objectives:

- Connect the idea of radicals with our work on Exponents.
- Introduce the meaning of Radicals and how to simplify radicals.
- Practice working with simplifying radicals.

(B) Investigations for Classwork: Meaning of Radicals → Rational Exponents:

- | | |
|---|--|
| a. Evaluate 2^2 _____. | e. Evaluate 3^2 _____. |
| b. Evaluate $4^{\frac{1}{2}}$: _____. | f. Evaluate $9^{\frac{1}{2}}$: _____. |
| c. Evaluate 6^2 _____. | g. Evaluate 11^2 _____. |
| d. Evaluate $36^{\frac{1}{2}}$: _____. | h. Evaluate $121^{\frac{1}{2}}$: _____. |

So the key idea with the exponent $\frac{1}{2}$ is that we are being asked to _____.

And our new notation will be $b^{\frac{1}{2}} =$ _____.

(C) Investigation for Classwork: Square Roots and Irrational Numbers

- Find all square roots of the following numbers: (a) 25 (b) 81 (c) 4 (d) x^2
- New Term → Principle Square Root → _____.
- Find the principal square root of each of the following real numbers and specify each answer accurate to the nearest *tenth*: (a) 40 (b) 12 (c) 22
- New Term → Irrational Numbers → _____.
- It is good to be able to estimate values of square roots that produce irrational numbers. Consider the following:
 - What is the value of $\sqrt{25}$? Justify. _____.
 - Write the whole number 6 as an expression involving a square root. _____.
 - Between what two consecutive integers must $\sqrt{30}$ lie? Explain without the use of a calculator.
- Between what two consecutive integers must $\sqrt{70}$ lie? Explain your answer without the use of a calculator.

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(D) Investigations for Classwork: Number Patterns:

a. Explain what is special about the numbers $\rightarrow 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, \dots$

b. Determine the prime factors of the following numbers:

75	72	60	125
48	24	27	363
8	12	147	800

(E) Simplifying Radicals.

a. Multiplication Principle of Radicals \rightarrow Multiply $\sqrt{4} \times \sqrt{9} =$ _____.

b. Multiplication Principle of Radicals \rightarrow Multiply $\sqrt{2} \times \sqrt{8} =$ _____.

c. Multiplication Principle of Radicals \rightarrow Multiply $\sqrt{3} \times \sqrt{12} =$ _____.

d. Multiplication Principle of Radicals \rightarrow Multiply $\sqrt{5} \times \sqrt{20} =$ _____.

e. State the Multiplication Principle in your own words

f. So how can we re-express $\sqrt{72}$ in a simpler “equivalent form”?

g. So let’s simplify the following radicals:

$\sqrt{75}$	$\sqrt{72}$	$\sqrt{60}$	$\sqrt{125}$
$\sqrt{48}$	$\sqrt{24}$	$\sqrt{27}$	$\sqrt{363}$
$\sqrt{8}$	$\sqrt{12}$	$\sqrt{147}$	$\sqrt{800}$

(F) Homework/Resources

- **HW:**

o <http://www.teacherweb.com/NY/Arlington/AlgebraProject/1L3SquareRootsandIrrationalNumbers.pdf>

- Video help from OnlineMathLearning with simplifying radicals:

o <http://www.onlinemathlearning.com/simplify-radicals.html>

- Reading from PurpleMath \rightarrow <http://www.purplemath.com/modules/radicals.htm>