

SUPPLEMENTAL LESSONS

**Mathematics Grade 9
2nd Quarter**



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2nd Quarter Grade 9 Supplemental Lesson Plan

Deriving the Laws of Radicals

I. Introduction

Elicit the students' prior knowledge on the laws of radicals using KWLH Strategy (Ogle, 1986) by answering the K and W columns.

What I Know	What I Want to Know	What I Learned	How Can We Learn More

II. Body

- Post the following radicals on the board. Tell the students to evaluate them.

a. $\sqrt{5^2}$	d. $\sqrt[5]{(2)^5}$
b. $\sqrt[3]{(-7)^3}$	e. $\sqrt{(-9)^2}$
c. $\sqrt[4]{(3)^4}$	

- Ask the students what they notice about the root of the given radicals. Lead the class to the conclusion that

$$\sqrt[n]{a^n} = a$$

- Post another set of radicals. This time, the radicand contains product or quotient.

a. $\sqrt{5^2 \cdot (-3)^2}$	d. $\sqrt[3]{\frac{a^6}{b^9}}$
b. $\sqrt[3]{\frac{-27}{64}}$	e. $\sqrt[4]{16 \cdot 81}$
c. $\sqrt{x^4 y^2}$	

Knowledge

Laws of Radicals

Learning Competency

M9AL-II-f-2

- Derives the laws of radicals

KU

- We can use the properties of real numbers to perform operations on radicals.

KQ

- How are real numbers and radicals related?

4. Ask the students to simplify the numerical radicands first. Then let them observe the similarities in the given radicals and make conjectures out of the observation. Lead the class to the conclusion that

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab} \text{ and } \sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b} \quad (\text{Product Rule})$$

$$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}} \text{ and } \sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}} \quad (\text{Quotient Rule})$$

5. Then, use the existing rules or the laws of exponents to derive

$$\sqrt[n]{a^m} = (\sqrt[n]{a})^m \text{ and } \sqrt[n]{\sqrt[m]{a}} = \sqrt[nm]{a}$$

6. Give the students practice exercises to apply the laws of radicals derived.
7. Using the Think-Pair-Share activity (Lyman, 1981), ask the students to answer the downloadable activity worksheets on simplifying radicals from www.rexinteractive.com.
- The students will work on the problems individually.
 - They will form pairs to discuss their thoughts and compare their answers.
 - The pairs will share their answers to the whole class.
8. For enhancement, let the students answer an online activity or game.
(Sample site: http://www.quia.com/rr/79719.html?AP_rand=26020396)

Rags to Riches: Answer questions in a quest for fame and fortune.

Radical Expressions
Simplify each radical expression

Tools
 Go back to my account
 Connect to a friend
 Find other activities
 Start timer
 Help

\$1,000,000
 \$500,000
 \$250,000
 \$128,000
 \$64,000
 \$32,000
 \$16,000
 \$8,000
 \$4,000
 \$2,000
 \$1,000
 \$500
 \$400
 \$300
 \$200

$\sqrt{144y^2}$

Hints Available:

A y|12|
B 12y|
C -12y
D 12y

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III. Conclusion

1. Ask the students to answer the L and H columns of the KWLH Chart.
2. Ask some volunteers to share their works.

