

Algebra 1B Live Lesson

U5L1: Simplifying Radicals
(Chapter 10-2 in textbook)



Agenda



1. Review selected problems and topics from Unit 5, Lesson 1 – Simplifying Radicals

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template



1. Announcements/To Do's
2. School-Wide Learner Outcomes
3. LL Objectives
4. Vocabulary words
5. Problems
6. Summary (End of class)

1. Write down important details.
2. What are you going to work on this week?
3. Write down your own questions.
4. Definitions (fill in as we go)
5. Steps to solving problems
6. 1 or 2 sentences about the LL class.

Reminders and To – Do's



Information

1. Complete 1 math lesson per day.
2. Check your WebMail every day
3. Be prepared to spend 4 - 6 hours per day on schoolwork.
4. Remind your Learning Coach to take daily attendance

What to do

1. Go to your Planner in Connexus to find the math lesson for the day
2. Go to Connexus to find WebMail
3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's



Information

5. Go to the Message Board first for information about our math class.

6. Contact Mr. Elizondo for math questions.

Remember: You need at least 2 phone calls with Mr. Elizondo per semester.

What to do

6. Call (559) 549 - 3244 and leave a voicemail if call is not answered.

Make an appointment at:
<https://elizondo.youcanbook.me>

Send a WebMail

U5L1 – California Common Core State Standards



- HSN-RN.A.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.

U5L1 - Vocabulary



- Radical expression
- Rationalize the denominator

U5L1 - Objectives



- Simplify radicals involving products and quotients

U5L1 - Introduction



▪ A **radical expression** is an expression that contains a radical

Examples: $2\sqrt{3}$ $\sqrt{x+3}$

▪ A radical expression is **simplified** if the following are true:

- The radicand has no perfect square factors other than 1
- The radicand contains no fractions
- No radicals appear in the denominator of the fraction

Simplified

$$3\sqrt{5} \quad 9\sqrt{x} \quad \frac{\sqrt{2}}{4}$$

Not Simplified

$$3\sqrt{12} \quad \sqrt{\frac{x}{2}} \quad \frac{5}{\sqrt{7}}$$

U5L1 - Multiplication Property of Square Roots



Property Multiplication Property of Square Roots

Algebra

For $a \geq 0$ and $b \geq 0$, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$.

Example

$$\sqrt{48} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3}$$

This is a useful property to use when simplifying radicals.

U5L1 - Removing Perfect-Square Factors



What is the simplified form of $\sqrt{72}$?

Method 1: $\sqrt{72} = \sqrt{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}$

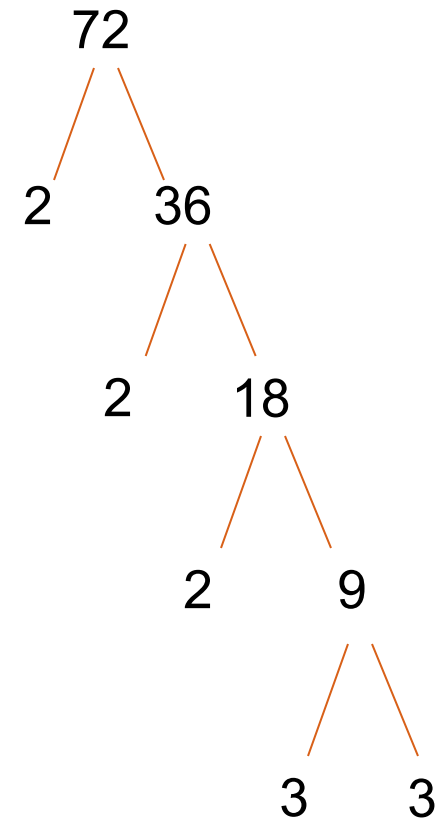
$$\sqrt{72} = 2 \cdot 3 \sqrt{2}$$

$$\sqrt{72} = 6\sqrt{2}$$

Method 2: $\sqrt{72} = \sqrt{36 \cdot 2}$

$$\sqrt{72} = \sqrt{36} \cdot \sqrt{2}$$

$$\sqrt{72} = 6\sqrt{2}$$



U5L1 - Radical Expressions with Variables

- A variable with an even exponent is a perfect square

Examples: $\sqrt{x^{10}} = x^5$

- A variable with an odd exponent is the product of a perfect square and the variable

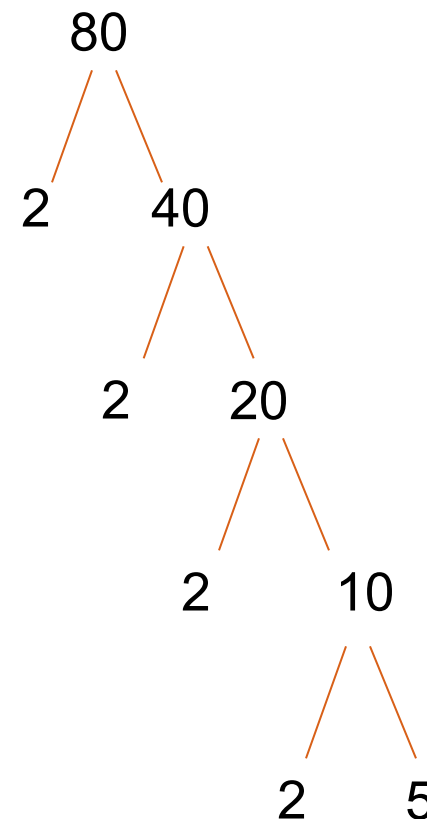
Example:
$$\begin{aligned}\sqrt{x^7} &= \sqrt{x^6 \cdot x} \\ &= \sqrt{x^6} \cdot \sqrt{x} \\ &= x^3 \sqrt{x}\end{aligned}$$

U5L1 - Removing Variable Factors



What is the simplified form of $-m\sqrt{80m^9}$?

$$\begin{aligned} -m\sqrt{80m^9} &= -m\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot m^8 \cdot m} \\ &= -m \cdot 2 \cdot 2 \cdot m^4 \sqrt{5 \cdot m} \\ &= -4m^5 \sqrt{5m} \end{aligned}$$



U5L1 - Multiplying Two Radical Expressions



What is the simplified form of $7\sqrt{5x} \cdot 3\sqrt{20x^5}$?

$$\begin{aligned}7\sqrt{5x} \cdot 3\sqrt{20x^5} &= 7 \cdot 3\sqrt{5x \cdot 20x^5} \\&= 21\sqrt{100x^6} \\&= 21\sqrt{100} \cdot \sqrt{x^6} \\&= 21 \cdot 10 \cdot x^3 \\&= 210x^3\end{aligned}$$

U5L1 - Division Property of Square Roots



Property Division Property of Square Roots

Algebra

For $a \geq 0$ and $b > 0$, $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$.

Example

$$\sqrt{\frac{36}{49}} = \frac{\sqrt{36}}{\sqrt{49}} = \frac{6}{7}$$

This is sometimes useful when the denominator is not a perfect square.

U5L1 - Simplifying Fractions Within Radicals



What is the simplified form of $\sqrt{\frac{8x^3}{50x}}$?

$$\begin{aligned}\sqrt{\frac{8x^3}{50x}} &= \sqrt{\frac{4x^2}{25}} \\ &= \frac{\sqrt{4x^2}}{\sqrt{25}} \\ &= \frac{\sqrt{4} \cdot \sqrt{x^2}}{\sqrt{25}} \\ &= \frac{2x}{5}\end{aligned}$$

U5L1 - Rationalizing Denominators



- When the denominator is not a perfect square, you may need to rationalize the denominator.
- Multiply the numerator and denominator by the same radical expression.

And remember...

$$\sqrt{x} \cdot \sqrt{x} = x$$

U5L1 - Rationalizing Denominators



What is the simplified form of each expression?

$$\text{A } \frac{\sqrt{3}}{\sqrt{7}}$$

$$\frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{3}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$$

$$= \frac{\sqrt{21}}{\sqrt{49}}$$

$$= \frac{\sqrt{21}}{7}$$

$$\text{B } \frac{\sqrt{7}}{\sqrt{8n}}$$

$$\frac{\sqrt{7}}{\sqrt{8n}} = \frac{\sqrt{7}}{2\sqrt{2n}}$$

$$= \frac{\sqrt{7}}{2\sqrt{2n}} \cdot \frac{\sqrt{2n}}{\sqrt{2n}}$$

$$= \frac{\sqrt{14n}}{2\sqrt{4n^2}}$$

$$= \frac{\sqrt{14n}}{4n}$$

Questions?



- Check the Message Board first
- Send a WebMail
- You can also make an appointment at <https://elizondo.youcanbook.me>
- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.

U5L1 - Review Problems



Simplify each radical expression.

1) $\sqrt{160}$

2) $\sqrt{54n^7}$

U5L1 - Review Problems



Simplify the radical expression.

3) $2\sqrt{7t} \cdot 3\sqrt{14t^2}$

U5L1 - Review Problems



Simplify each radical expression.

$$4) \sqrt{\frac{64}{49}}$$

$$5) \sqrt{\frac{8x^3}{50x}}$$

U5L1 - Review Problems



Simplify each radical expression.

$$6) \frac{\sqrt{3}}{\sqrt{7}}$$

$$7) \frac{\sqrt{7}}{\sqrt{8n}}$$