Algebra 1B Live Lesson

U2L3 - Multiplying Powers with the Same Base
(Chapter 7-3 in textbook)

Agenda

1. Review selected problems and topics from U2L3.

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	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information	What to do
1. Complete 1 math lesson per day.	1. Go to your Planner in Connexus to find the math lesson for the day
2. Check your WebMail every day	2. Go to Connexus to find WebMail
3. Be prepared to spend 4 - 6 hours per day on schoolwork.	3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Remind your Learning Coach to take daily attendance	4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	5. Link to Message Board:
6. Contact Mr. Elizondo for math questions. Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	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

U2L3 - Objectives

- Multiply powers with the same base

U2L3 - Vocabulary

- Power
- Base
- Exponent

U2L3 - Introduction

- There is a property of exponents to help us multiply powers with the same base.
- Let's try to figure it out.

$$3^4 \cdot 3^2 = (3 \cdot 3 \cdot 3 \cdot 3) \cdot (3 \cdot 3)$$

$$3^4 \cdot 3^2 = 3^6$$

$$(-2)^4 \cdot -2 = (-2 \cdot -2 \cdot -2 \cdot -2) \cdot (-2)$$

$$(-2)^4 \cdot -2 = -2^5$$

U2L3 – Multiplying Powers

take note

Property Multiplying Powers With the Same Base

Words To multiply powers with the same base, add the exponents.

Algebra $a^m \cdot a^n = a^{m+n}$, where $a \neq 0$ and m and n are integers

Examples $4^3 \cdot 4^5 = 4^{3+5} = 4^8$ $\quad$ $b^7 \cdot b^{-4} = b^{7+(-4)} = b^3$

Here's Why It Works You can use repeated multiplication to rewrite a product of powers.

$$a^m \cdot a^n$$

$$= \underbrace{(a \cdot a \cdot \ldots \cdot a)}_{m \text{ factors of } a} \cdot \underbrace{(a \cdot a \cdot \ldots \cdot a)}_{n \text{ factors of } a} =$$

$$\underbrace{a \cdot a \cdot \ldots \cdot a}_{m \,+\, n \text{ factors of } a} = a^{m+n}$$

U2L3 – Multiplying Powers

What is each expression written using each base only once?

$$12^4 \cdot 12^3 = 12^{4+3}$$

$$= 12^7$$

$$(-5)^{-2}(-5)^7 = (-5)^{-2+7}$$

$$= (-5)^5$$

$$9^{-3} \cdot 9^2 \cdot 9^6 = 9^{-3+2+6}$$

$$= 9^{-1+6}$$

$$= 9^5$$

U2L3 - Multiplying Powers

When there is more than one base in an expression, be careful!

Only combine the powers with the same base!

$$4z^5 \cdot 9z^{-12} = (4 \cdot 9)(z^5 \cdot z^{-12})$$

$$= 36(z^{5+(-12)})$$

$$= 36z^{-7}$$

$$= \frac{36}{z^7}$$

U2L3 - Multiplying Powers

When there is more than one base in an expression, be careful!

Only combine the powers with the same base!

$$2a \cdot 9b^4 \cdot 3a^2 = (2 \cdot 9 \cdot 3)(a \cdot a^2)(b^4)$$

$$= 54(a^1 \cdot a^2)(b^4)$$

$$= 54(a^{1+2})(b^4)$$

$$= 54a^3b^4$$

U2L3 – Multiplying Numbers in Scientific Notation

Use the same properties when multiplying two numbers written in scientific notation.

What is the simplified form of $(3 \times 10^5)(5 \times 10^{-12})$? Write your answer in scientific notation.

$$(3 \times 10^5)(5 \times 10^{-12}) = (3 \cdot 5)(10^5 \cdot 10^{-12})$$

$$= 15 \cdot 10^{-7}$$

$$= 1.5 \times 10^1 \cdot 10^{-7}$$

$$= 1.5 \times 10^{-6}$$

U2L3 – Multiplying Numbers in Scientific Notation

The diameter of a penny is about 1.9×10^{-5} km. It would take about 2.1×10^{9} pennies placed end to end to circle the equator once. What is the approximate length of the equator?

If the diameter of a penny was 2 cm, and it took 100 pennies end to end to circle the equator, how would you find the approximate length of the equator?

$$(1.9x10^{-5})(2.1x10^{9}) = (1.9x2.1)(10^{-5}x10^{9})$$

$$= (3.99)(10^{-5+9})$$

$$= (3.99)(10^{4})$$

The equator is approximately 3.99×10^{4} km.

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.