Algebra 1B Live Lesson

U2L5 – Division Properties of Exponents
(Chapter 7-5 in textbook)

Agenda

1. Review selected problems and topics from U2L4 (Chapter 7-5 in textbook).

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

U2L5 - Objectives

- Divide powers with the same base
- Raise a quotient to a power

U2L5 - Vocabulary

- Power
- Base
- Exponent
- Quotient

U2L5 – Introduction

You can use repeated multiplication to simplify quotients of powers with the same base.

$$\frac{4^5}{4^3} = \frac{\cancel{4} \cdot \cancel{4} \cdot \cancel{4} \cdot 4 \cdot 4}{\cancel{4} \cdot \cancel{4} \cdot \cancel{4}} = 4^2$$

U2L5 – Introduction

take note

Property Dividing Powers With the Same Base

Words	To divide powers with the same base, subtract the exponents.
Algebra	$\frac{a^m}{a^n} = a^{m-n}$, where $a \neq 0$ and m and n are integers
Examples	$\frac{2^6}{2^2} = 2^{6-2} = 2^4$ $\qquad$ $\frac{x^4}{x^7} = x^{4-7} = x^{-3} = \frac{1}{x^3}$

U2L5 – Dividing Algebraic Expressions

What is the simplified form of each expression?

$$\frac{x^8}{x^3}$$

$$\frac{x^8}{x^3} = x^{8-3}$$

$$= x^5$$

$$\frac{m^2n^4}{m^5n^3}$$

$$\frac{m^2n^4}{m^5n^3} = m^{2-5}n^{4-3}$$

$$= m^{-3}n^1$$

$$= \frac{n}{m^3}$$

U2L5 – Dividing in Scientific Notation

Demographics Population density describes the number of people per unit area. During one year, the population of Angola was 1.21×10^7 people. The area of Angola is 4.81×10^5 mi^2. What was the population density of Angola that year?

$$\frac{\textit{Number of people}}{\textit{Unit Area}} = \frac{1.21 \times 10^7}{4.81 \times 10^5} = \frac{1.21}{4.81} \times 10^{7-5}$$

$$= \frac{1.21}{4.81} \times 10^2$$

$$\approx 0.252 \times 10^2$$

$$= 25.2$$

U2L5 - Raising a quotient to a power

take note

Property Raising a Quotient to a Power

Words	To raise a quotient to a power, raise the numerator and the denominator to the power and simplify.
Algebra	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$, where $a \neq 0$, $b \neq 0$, and n is an integer
Examples	$\left(\frac{3}{5}\right)^3 = \frac{3^3}{5^3} = \frac{27}{125}$ $\qquad$ $\left(\frac{x}{y}\right)^5 = \frac{x^5}{y^5}$

U2L5 - Raising a quotient to a power

Multiple Choice What is the simplified form of $\left(\frac{z^4}{5}\right)^3$?

(A) $\frac{z^7}{15}$ (B) $\frac{z^{12}}{15}$ (C) $\frac{z^7}{125}$ (D) $\frac{z^{12}}{125}$

$$\left(\frac{z^4}{5}\right)^3 = \frac{(z^4)^3}{5^3}$$

$$= \frac{z^{4\cdot 3}}{5^3}$$

$$= \frac{z^{12}}{125}$$

U2L5 - Raising a quotient to a power

ONE TIP

$$\left(\frac{a}{b}\right)^{-n} = \frac{a^{-n}}{b^{-n}} = \frac{\frac{1}{a^n}}{\frac{1}{b^n}} = \frac{1}{a^n} \div \frac{1}{b^n} = \frac{1}{a^n} \bullet \frac{b^n}{1}$$

$$= \frac{b^n}{a^n}$$

$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{n}$ for all nonzero numbers a and b and positive integers n.

U2L5 – Simplifying an Exponential Expression

$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{n}$ for all nonzero numbers a and b and positive integers n.

What is the simplified form of $\left(\frac{2x^6}{y^4}\right)^{-3}$?

$$\left(\frac{2x^6}{y^4}\right)^{-3} = \left(\frac{y^4}{2x^6}\right)^{3}$$

$$= \frac{(y^4)^3}{(2x^6)^3}$$

$$= \frac{y^{12}}{2^3(x^6)^3} \quad = \frac{y^{12}}{8x^{18}}$$

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.