Welcome to Algebra 2

Meeting Times:

Wednesday, 11:20 - 12:20 PM
Thursday (on Zoom), 2:00 - 3:00 PM
Open Zoom
Click “Join”
enter “458 466 2456”

Homework:
1A, B, C, D, E. Test 1
2A, B, C, D, E. Test 2….etc

Turn in homework via 1 .PDF to our website.

Calculator:
TI-84 Plus CE

We are going to learn how to program our calculator this year using the Quadratic Equation.

Tests:
3 in-class tests
Need to complete practice test before actual test is handed
Out this year. Practice test is worth 10 test points.

My email: cedarforest7@gmail.com
My phone number: 425.681.6132

If you have looked at your notes, and watched the video, and are still stuck on a problem, text me a picture of the problem.

Ch. 1 - Exponent Review

Negative Exponents.

exp

num / den

move

change sign

$9^{-2} = \frac{1}{9^2}$

$\frac{1}{9^{-2}} =$

$\frac{1}{\frac{1}{9^2}}$

$\frac{1}{10^{-3}} =$

$10^{7} =$

Multiplying Numbers w/ Same Base

$2^4 \cdot 2^5 =$

$4^2 \cdot 4^{-3} \cdot 4^7 =$

$8^{2x} \cdot 8^{3x} \cdot 8^3 =$

$8^{17} \cdot 2^2$

$2^3 =$

$2^{51} \cdot 2^2$

Lesson 1 Exponents

We'll begin this lesson with a review of what we know about exponents. If any of this is new, spend what time you need to learn the new material and do all of the practice problems. Once you feel comfortable with what you have learned, move on to the next topic. Even though we'll review this material again in the worksheets, it won't be taught again. So get it down now, for it will be assumed from this point on that you understand these concepts. If this is all pure review, do a few problems in each sub-section, then proceed to the next lesson.

Negative Exponents There are two options for placing a number, or variable, when writing a fraction; either put it in the numerator, or in the denominator. Similarly, there are two signs to use when describing a number, positive or negative. When you put these two concepts together you have everything you need to understand negative exponents. The key phrase is: when you change the place for a number or variable, you change the sign at the same time. Another way to state this is: opposite place, opposite sign. Closely observe the following examples, do the practice problems, and compare your work with the solutions.

Make the exponent positive, then simplify.

Example 1 $9^{-2} = \frac{1}{9^2} = \frac{1}{81}$

Example 2 $X^{-3} = \frac{1}{X^3}$

Move the term with the exponent to the numerator, then simplify.

Example 3 $\frac{1}{A^4} = A^{-4}$

Example 4 $\frac{1}{10^{-3}} = 10^3 = 1000$

Practice Problems

1) $5^{-2} =$

2) $X^{-5} =$

3) $Y^{-4} =$

4) $3^{-3} =$

5) $\frac{1}{Y^6} =$

6) $\frac{1}{2^{-3}} =$

7) $7^2 =$

8) $\frac{1}{10^{-4}} =$

Multiplying Numbers with the Same Base If a number is multiplied by another number with the same base, you may add the exponents. The same holds true for variables with exponents. Study the examples and observe this relationship being worked out.

Example 1 $2^3 \cdot 2^4 = (2^1 \cdot 2^1 \cdot 2^1)(2^1 \cdot 2^1 \cdot 2^1 \cdot 2^1) = 2^7 = 128$

or $2^3 \cdot 2^4 = (8)(16) = 128$

Example 2 $4^2 \cdot 4^3 = (4^1 \cdot 4^1)(4^1 \cdot 4^1 \cdot 4^1) = 4^5$

or $4^2 \cdot 4^3 = (16)(64) = 1{,}024$

Practice Problems

1) $X^2 \cdot X^3 \cdot X^4 =$

2) $4^2 \cdot 4^1 \cdot 4^{-1} =$

3) $X^A \cdot X^{2B} =$

4) $X^8 \cdot X^3 \cdot X^A =$

5) $Y^{-1} \cdot Y^5 \cdot Y^2 =$

6) $5^{-2} \cdot 5^6 \cdot 5^0 =$

7) $Y^A \cdot Y^{-B} =$

8) $7^{2X} \cdot 7^3 \cdot 7^X =$

DIVIDE NUMBERS W/SAME BASE

$2^5 \div 2^2 = 2^3$

$\frac{x^{-8}}{x^{-6}} =$

$-8 - (-6) =$

$x^{-8} \cdot x^6 =$

ZERO AS AN EXPONENT

$2^0 = 1$ $5^0 =$, $7{,}329^0 =$

$= \frac{2^5}{2^5} =$

RAISING AN EXPONENT TO AN EXPONENT

$(6^7)^3 = 6^{21}$ $(x^4)^5 = x^{20}$

$(((5^{-2})^3)^4) =$

$(16^4 \cdot 4^2)^3$

Dividing Numbers with the Same Base If a number is divided by another number with the same base, you can subtract the exponents. The same holds true for variables with exponents. Study the examples and observe this relationship as it is being worked out.

Example 1 $2^5 \div 2^2 = \frac{\cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2}} = 2^3 = 8$

$= 2^{5-2} = 2^3 = 8$

Example 2 $2^1 \div 2^5 = \frac{\cancel{2}}{\cancel{2} \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{1}{2^4} = \frac{1}{16}$

$= 2^{1-5} = 2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

Practice Problems

1) $X^5 \div X^2 =$

2) $\frac{X^3}{X^7} =$

3) $\frac{3^{-4}}{3^{-1}} =$

4) $4^{-5} \div 4^{-2} =$

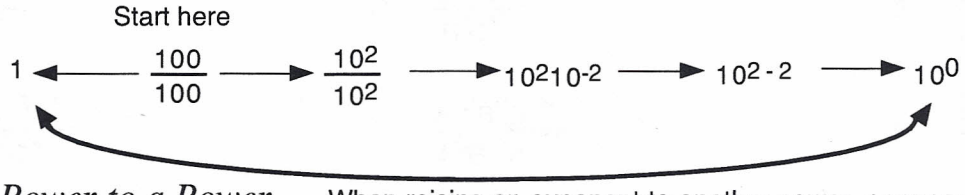
5) $Y^8 \div Y^{-1} =$

6) $Y^4 \div Y^{-6} =$

7) $6^{-2} \div 6^{-5} =$

8) $\frac{9^4}{9^8} =$

Zero as an Exponent Using what we just covered about adding and subtracting exponents when multiplying and dividing numbers with the same base, we'll show that anything with a zero exponent equals 1.



Raising a Power to a Power When raising an exponent to another power, or exponent, you fast add, or multiply, the exponents. In this example we either add 7 + 7 + 7 = 21 or multiply 7 x 3 = 21.

Example 1 $(6^7)^3 = (6^7)(6^7)(6^7) = (6^{7+7+7}) = (X^{3\times7}) = (6^{21})$

Example 2 $(X^5)^4 = (X^5)(X^5)(X^5)(X^5) = (X^{5+5+5+5}) = (X^{5\times4}) = (X^{20})$

SIMPLIFYING EXPONENTIAL EXPRESSIONS

① $\dfrac{x^3 \cdot x^{-2}}{x \cdot x^4} =$

② $\dfrac{x^{-2} \cdot y^{-3} \cdot y \cdot x^4}{x \cdot y^2} =$

③ $\dfrac{A^{-2} \cdot B^6 \cdot B^{-8}}{A^6 \cdot B^{-1} \cdot A^{-5}} =$

Practice Problems

1) $(2^3)^5 =$ 2) $(4^{-2})^9 =$ 3) $(8^0)^{-3} =$ 4) $(B^{-2})^{-4} =$

5) $(A^7)^{-3} =$ 6) $(X^{-3})^0 =$ 7) $(10^4)^{-6} =$ 8) $[(Y^7)^3]^3 =$

Simplifying an Exponential Expression

There are two techniques that may be employed in simplifying an exponential expression. The first is to have everything in the numerator, and the second is to make all the exponents positive. In the examples, the problems will be done both ways for your examination.

Example 1 $\dfrac{X^3X^{-2}}{X^1X^4} = \dfrac{X^3}{X^1X^4X^2} = \dfrac{X^3}{X^7} = X^{3-7} = X^{-4}$ Making all the exponents positive

$\dfrac{X^3X^{-2}}{X^1X^4} = \dfrac{X^3X^{-2}X^{-1}X^{-4}}{1} = X^{-4}$ Putting all in the numerator

Example 2 $\dfrac{X^{-2}Y^{-3}Y^1X^4}{X^1Y^2} = \dfrac{Y^1X^4}{X^2X^1Y^3Y^2} = \dfrac{Y^1X^4}{Y^5X^3} = Y^{-4}X^1$ Making all the exponents positive

$\dfrac{X^{-2}Y^{-3}Y^1X^4}{X^1Y^2} = \dfrac{X^{-2}X^{-1}X^4Y^{-3}Y^1Y^{-2}}{1} = X^1Y^{-4}$ Putting all in the numerator

Practice Problems

Use either method to solve.

1) $\dfrac{A^2B^2}{A^{-6}B^5} =$ 2) $\dfrac{B^{-6}C^4}{B^1C^9} =$ 3) $\dfrac{H^4N^7}{H^{-1}N^3} =$

4) $\dfrac{C^{-2}C^{-3}D^1}{D^1D^2C^4} =$ 5) $\dfrac{A^{-2}B^6B^{-8}}{A^6B^{-1}A^{-5}} =$ 6) $\dfrac{P^2Q^{-2}P^1}{Q^{-4}Q^2P^3} =$

LESSON PRACTICE

1A

Simplify, and express with positive exponents. Because we cannot divide by zero, the value of an unknown is assumed to be such that the denominator will not equal zero.

1. $3^{-2} =$

2. $X^{-1} =$

3. $\left(-\frac{2}{3}\right)^2 =$

4. $\frac{1}{2^{-3}} =$

5. $\frac{1}{X^{-5}} =$

6. $\left(\frac{1}{2}\right)^3 =$

Multiply.

7. $2^2 \cdot 2^6 \cdot 2^3 =$

8. $R \cdot R^4 \cdot R^2 =$

9. $X^{-1} \cdot X^3 \cdot X^{-4} =$

10. $3^A \cdot 3^B =$

11. $4^0 \cdot 4^{-2} \cdot 4^2 =$

12. $X^A \cdot X^{2A} \cdot X^B =$

If you need to review algebra concepts, go to the "Basic Algebra Review" on page 387 of this book.