

Accuplacer Study Modules
TOPIC: Multiplication and Division Properties of Exponents

Watch the video: <https://www.youtube.com/watch?v=3Axm0dwStss>

Prerequisite Definitions:

- Base: the number or variable which is being raised to a power
 - Ex: in the expression $3x^4$, x is the base.
- Exponent: the power to which a number or variable is being raised
 - Ex: in the expression $3x^4$, 4 is the power.
- Coefficient: the number in front of the variable connected by multiplication
 - Ex: in the expression $3x^4$, 3 is the coefficient.

Steps to Multiplying Expressions with Exponents: To multiply expressions with like bases, add the exponents, and multiply the coefficients.

Step 1: Identify the coefficients, and multiply them.

Step 2: Identify like bases. Add the exponents of the like bases. The new expression will have the same base and the exponent will be the sum of the original exponents.

Step 3: Rewrite the expression with the new coefficient in front following by each base with new exponents.

Sample Problem: Simplify the expression $2x^4y^2(5x^3y^6)$.

Step 1: $2 * 5 = 10$ so the new expression is $10x^4y^2x^3y^6$.

Step 2:

Part a: $x^4 * x^3 = x^{4+3} = x^7$

Part b: $y^2 * y^6 = y^{2+6} = y^8$

Step 3: The new expression is $10x^7y^8$

Steps to Dividing Expressions with Exponents: To divide expressions with like bases, subtract the exponents, and divide the coefficients.

Step 1: Identify the coefficients, and divide them. If the quotient is not a whole number, simplify the fraction.

Step 2: Identify like bases. Subtract the exponents of the like bases. The new expression will have the same base and the exponent will be the difference of the original exponents. Write the base and new exponent on the numerator if the larger exponent was on the numerator. Write the base and new exponent on the denominator if the larger exponent was on the denominator.

Step 3: Rewrite the expression with the new coefficient in front following by each base with new exponents.

Sample Problem: Simplify the expression $\frac{20x^8y^6}{4x^3y^9}$.

Step 1: $20 \div 4 = 5$ so the new expression is $\frac{5x^8y^6}{x^3y^9}$.

Step 2:

Part a: $\frac{x^8}{x^3} = x^5$ which goes on the numerator because 8 is larger than 3.

Part b: $\frac{y^6}{y^9} = y^3$ which goes on the denominator because 9 is larger than 6.

Step 3: The new expression is $\frac{5x^5}{y^3}$.

Practice:

Multiply $4x^2y^3x^4y^9$.	Divide $\frac{9x^7y}{6x^4y^3}$.
Find the area of a rectangle with a length of $2x^5y^8$ and a width of x^8y^3 .	Simplify the expression $\frac{5x^2y^3x^5}{15y^4}$.