

Accuplacer Study Modules

TOPIC: Exponent Rules

Khan Academy Link: <https://www.khanacademy.org/math/algebra-home/pre-algebra/exponents-radicals/exponent-properties/v/exponent-rules-part-1>

RULES OF EXPONENTS			
Exponent Rule	Algebraic	Verbal Explanation	Example
Product Rule	$a^m \cdot a^n = a^{m+n}$	When multiplying powers with the same base, you ADD the exponents.	$a^5 \cdot a^7 = a^{5+7} = a^{12}$
Quotient Rule	$\frac{a^m}{a^n} = a^{m-n}$	When multiplying powers with the same base, you SUBTRACT the exponents.	$\frac{a^{10}}{a^4} = a^{10-4} = a^6$
Power of a Power	$(a^m)^n = a^{m \cdot n}$	When raising a power to another power, you MULTIPLY the exponents.	$(a^2)^4 = a^{2 \cdot 4} = a^8$
Power of a Product	$(ab)^n = a^n b^n$	When powers that are being multiplied are raised to another power, you apply the exponent to each.	$(ab)^5 = a^5 b^5$
Power of a Quotient	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	When powers that are being divided are raised to another power, you apply the exponent to each.	$\left(\frac{a}{b}\right)^3 = \frac{a^3}{b^3}$

Examples:

$x^2y^3 \cdot x^5y^4$	Original Problem
$x^{2+5}y^{3+4}$	Power Rule
x^7y^7	Simplify Exponents

$\frac{x^8y^7}{x^6y^2}$	Original Problem
$x^{8-6}y^{7-2}$	Quotient Rule
x^2y^5	Simplify Exponents

$(x^4y^5)^2$	Original Problem
$(x^4)^2(y^5)^2$	Power of a Product
$x^{4 \cdot 2}y^{5 \cdot 2}$	Power of a Power
x^8y^{10}	Simplify Exponents

$\left(\frac{x^5y^4}{x^3y^2}\right)^3$	Original Problem
$\frac{(x^5)^3(y^4)^3}{(x^3)^3(y^2)^3}$	Power of Product
$\frac{x^{5 \cdot 3}y^{4 \cdot 3}}{x^{3 \cdot 3}y^{2 \cdot 3}}$	Power of a Power
$\frac{x^{15}y^{12}}{x^9y^6}$	Simplify Exponents
$x^{15-9}y^{12-6}$	Power of a Quotient
x^6y^6	Simplify Exponents

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Instructions: Simplify each expression.

1. $x^3 \cdot x^4 \cdot x^6$

2. $(x^4y^8)^5$

3. $\frac{x^5y^8}{x^4y^2} \cdot \frac{x^7y^6}{x^5y^3}$

4. $\frac{(x^3y^4)^7}{(x^5y^2)^3}$