

### Detailed Examples of Exponent Rules

<u>Simplify</u>	<u>Name of Rule</u>	<u>Apply Rule (Show Work)</u>	<u>Give Result in Simplest Form (No negative or zero exponents)</u>
$\frac{x^5}{x^2}$	Quotient Rule	$\frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x} = x^3 \quad \left  \quad \frac{x^5}{x^2} = x^{(5-2)} = x^3$	$x^3$
$\left(\frac{5x^3}{z}\right)^2$	Expanded Power Rule	$\frac{5^{(1 \cdot 2)} x^{(3 \cdot 2)}}{z^{(1 \cdot 2)}} = \frac{5^2 x^6}{z^2} = \frac{25x^6}{z^2}$	$\frac{25x^6}{z^2}$
$x^5 x^2$	Product Rule	$x^{(5+2)}$ or $(x \cdot x \cdot x \cdot x \cdot x)(x \cdot x) = x^7$	$x^7$
$(x^5)^2$	Power Rule	$x^5 \cdot x^5 = (x \cdot x \cdot x \cdot x \cdot x)(x \cdot x \cdot x \cdot x \cdot x) = x^{10} \quad \left  \quad x^{(5 \cdot 2)} = x^{10}$	$x^{10}$
$(x^2 y^3)^3$	Expanded Power Rule	$x^{(2 \cdot 3)} y^{(3 \cdot 3)} = x^6 y^9$	$x^6 y^9$
$5x^0$	Zero Exponent Rule	$5x^0 = 5 \cdot 1 = 5$	5
$(x^3 y^2 z^5)^0$	Zero Exponent Rule	$(x^3 y^2 z^5)^0 = 1$	1
$8^{-2}$	Negative Exponent Rule	$8^{-2} = \frac{1}{8^2} = \frac{1}{64}$	$\frac{1}{64}$
$(x^{-4})^3$	Power Rule & Negative Exponent Rule	$x^{(-4)(3)} = x^{-12} = \frac{1}{x^{12}}$	$\frac{1}{x^{12}}$
$\frac{x^3}{x^{-7}}$	Quotient Rule & Negative Exponent Rule	$\frac{x^3}{x^{-7}} = x^{[3-(-7)]} = x^{(3+7)} = x^{10} \quad \left  \quad \frac{x^3}{x^{-7}} = x^3 x^7 = x^{(3+7)} = x^{10}$	$x^{10}$
$\frac{x^{-5}}{x^2}$	Quotient Rule & Negative Exponent Rule	$\frac{x^{-5}}{x^2} = x^{(-5-2)} = x^{-7} = \frac{1}{x^7} \quad \left  \quad \frac{x^{-5}}{x^2} = \frac{1}{x^2 x^5} = \frac{1}{x^7}$	$\frac{1}{x^7}$
$\left(\frac{x^4 y}{z^3}\right)^2$	Expanded Power Rule	$\left(\frac{x^4 y}{z^3}\right)^2 = \frac{x^{(4 \cdot 2)} y^2}{z^{(3 \cdot 2)}} = \frac{x^8 y^2}{z^6}$	$\frac{x^8 y^2}{z^6}$
$\left(\frac{12x^3 y^2}{3x^2 y^2}\right)^3$	Expanded Power Rule, Quotient Rule, & Zero Exponent Rule	$\left(\frac{12}{3} \cdot \frac{x^3}{x^2} \cdot \frac{y^2}{y^2}\right)^3 = 4 \cdot x^{3-2} \cdot y^{2-2} = 4x^1 y^0 = 4x \cdot 1 = 4x$	$(4x)^3$ or $64x^3$