Quotient and Power of a Quotient Rules

Quotient Rule for Exponents

If m and n are any integers and $a \neq 0$, then $a^m \div a^n = \dfrac{a^m}{a^n} = a^{m-n}$

To divide expressions with like bases, subtract the exponent of the denominator from the exponent of the numerator to get the exponent of the common base in the quotient.

$$\frac{a^5}{a^2} = a^{5-2} = a^3 \qquad \frac{y^{-3}}{y^{-5}} = y^{-3--5} = y^2$$

TRY: $\dfrac{a^7}{a^4}$

Power of a Quotient Rule

If a and b are nonzero real numbers and n is any integer, then $\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}$

When a fraction is raised to a power, the numerator and the denominator are both raised to that power.

$$\left(\frac{5x}{2y^4}\right)^3 = \frac{5^3 x^3}{2^3 y^{12}} = \frac{125x^3}{8y^{12}} \qquad \left(\frac{2}{3}x\right)^3 = \left(\frac{2}{3}\right)^3 x^3 = \frac{8}{27}x^3$$

TRY: $\left(\dfrac{6m}{7p}\right)^2$ $\qquad\qquad\qquad\qquad$ $\dfrac{(3a^2)^3}{(4a^3)^2}$

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