

TOPIC: THE QUOTIENT RULE

The Quotient Rule for Exponents

EXPONENT RULES			
Name	Example	Rule	Description
Product Rule	$4^2 \times 4^1 = 4 \times 4 \times 4 = 4^3 = 4^{2+1}$	$a^m \times a^n = a^{m+n}$	Multiply terms w/ same base \Rightarrow [ADD SUBTRACT] exp.
Quotient Rule	$\frac{4^3}{4^1} = \quad \quad \quad = 4^{-} = 4^{-}$	$\frac{a^m}{a^n} = a^{m-n}$	Divide terms w/ same base \Rightarrow [ADD SUBTRACT] exp. ALWAYS _____ - _____

EXAMPLE

Use the quotient rule to evaluate or simplify each exponential expression.

(A) $\frac{y^7}{y^5}$

(B) $\frac{m^6}{m^6}$

◆ Zero Exponent Rule: *ANYTHING* (except 0) raised to _____ exponent = _____

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Recall

$$\frac{a^m}{a^n} = a^{m-n}$$
$$a^0 = 1$$

PRACTICE

Simplify each expression.

(A) $\frac{y^{27}}{y^9}$

(B) *Hint: rewrite using exponents first.*

$$\frac{64}{16}$$

(C) $(-4t)^0, t \neq 0$

EXAMPLE

Use the quotient rule to rewrite the expression, then simplify.

$$\frac{9}{16} \div \frac{3}{4}$$

PRACTICE

Use the quotient rule to rewrite each expression, then simplify.

(A) $\frac{12b^{11}}{4b^7}$

(B) $\frac{9x^2y^8}{3xy^2}$

(C) $\frac{30x^5y^3z^3}{-15x^2y^3z}$