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	$\dfrac{4^3}{4^1} = \qquad = 4^{} = 4^{}$	$\dfrac{a^m}{a^n} = a^{m-n}$	*Divide* terms w/ **same base** $\Rightarrow$ [ADD | SUBTRACT] exp. ALWAYS _____ – _____

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

(A)

$$\dfrac{y^7}{y^5}$$

(B)

$$\dfrac{m^6}{m^6}$$

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

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PRACTICE Simplify each expression.

(A)

$$\frac{y^{27}}{y^{9}}$$

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

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

(C)

$$(-4t)^{0}, t \neq 0$$

Recall

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

$$a^{0} = 1$$

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)

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

(C)

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