

Integer Exponents and the Quotient Rule

Example 1:

$$\frac{x^{10}}{x^7} = \frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x \cdot x \cdot x \cdot x} = \underline{\hspace{2cm}}$$

The Quotient Rule: When dividing terms of the same base, subtract the exponents.

$$\frac{x^{10}}{x^7} = x^{10-7} = \underline{\hspace{2cm}}$$

Example 2:

$$\frac{x^7}{x^{10}} = \frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x} = \underline{\hspace{2cm}}$$

Using the Quotient Rule:

$$\frac{x^7}{x^{10}} = x^{7-10} = x^{-3} = \frac{1}{x^3}$$

NOTE:

$$2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$$

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$2^2 = 2 \cdot 2 = 4$$

$$2^1 = 2 = 2$$

$$2^0 = 1 \quad (\text{Any base raised to the ZERO Power is 1})$$

$$2^{-1} = \frac{1}{2}$$

$$2^{-2} = \frac{1}{2 \cdot 2} = \frac{1}{4}$$

Example 3:

a.) $3^{-4} =$ _____

b.) $6^0 =$ _____

c.) $(-2)^{-4} =$ _____

d.) $-2^{-4} =$ _____

e.) $\frac{1}{2^{-3}} =$ _____

f.) $\frac{x^{12}}{x^3} =$ _____

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Practice Problems

Simplify each expression. Write your answers with positive exponents only.

1. $\frac{x^{14}}{x^8}$

2. $\frac{x^8}{x^{14}}$

3. 5^0

4. $(-3)^3$

5. -3^3

6. $(-3)^{-3}$

7. -3^{-3}