

Content and Language Objective:

Students will explore the rules for dividing exponents and recall the rules they have already used to solve a variety of problems.

Warm-Up

Simplify and solve.

$$(32x)^{-2}$$
$$32 \cdot x^{-2}$$

$$1. 7^{-3} \bullet 7^5 = 7^2$$

$$2. 8x^3 \bullet 4x^{-5} = 32x^{-2} = \frac{32}{x^2}$$

Content and Language Objective:

Students will explore the rules for dividing exponents and recall the rules they have already used to solve a variety of problems.

When we used the **product rule** we **add** the exponents of like bases, when we use the **quotient rule** we will **subtract** the exponents of like bases.

$$\frac{2^3}{3^4} \quad 4^3 \bullet 4^5 = 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 = 4^8 \quad 3^{-4} \cdot 3^1 = 3^{-4+1} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$$

$$\frac{6^5}{6^3} = \frac{6 \bullet 6 \bullet 6 \bullet 6 \bullet 6}{6 \bullet 6 \bullet 6} = \frac{6}{6} \bullet \frac{6}{6} \bullet \frac{6}{6} \bullet \frac{6}{1} \bullet \frac{6}{1} = 1 \bullet 1 \bullet 1 \bullet 6 \bullet 6 = 6^2$$
$$\frac{6^3}{6^5} = 6^{3-5} = 6^{-2} = \frac{1}{6^2}$$

Because there are "two more" 6s in the numerator, the result is $6^{5-3} = 6^2$. Thus, to divide exponential expressions with like bases, subtract exponents.

Content and Language Objective:

Students will explore the rules for dividing exponents and recall the rules they have already used to solve a variety of problems.

Try It!

$$\frac{3^6}{3^2} = 3^{2-6} = 3^{-4} = \frac{1}{3^4}$$
$$= 3^{6-2} = 3^4 = 81$$

$$\frac{2^{-6}}{2^{-4}} \quad -6 + 4$$
$$\frac{1}{2^2} = \frac{1}{4}$$

Content and Language Objective:

Students will explore the rules for dividing exponents and recall the rules they have already used to solve a variety of problems.

More Practice

$$\frac{10^4}{10^6} \quad 10^{-2} = \frac{1}{10^2} =$$

$$\left(\frac{1}{100} \right)$$

$$\frac{x^5}{x^2} \quad x^3$$

$$\frac{1}{3} a^{-6} b^8 = \frac{1b^8}{3a^6}$$

$$\frac{15x^2y^3}{5x^4y} \quad x^{2-4} \quad \frac{15y^3}{5x^2} = \frac{3y^3}{x^2}$$

$$\frac{3a^{-2}b^5}{9a^4b^{-3}} = \frac{3}{9} \cdot \frac{a^{-2}}{a^4} \cdot \frac{b^5}{b^{-3}} \\ \frac{1}{3} a^{-2-4} b^{5-(-3)}$$