Warm Up

Simplify:

$$\frac{x^7y^4z}{x^3y^5z^5}$$

$$\frac{x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot y\cdot y\cdot y\cdot y\cdot z}{x\cdot x\cdot x\cdot y\cdot y\cdot y\cdot y\cdot y\cdot z\cdot z\cdot z\cdot z\cdot z\cdot z}$$

$$\frac{x\cdot x\cdot x\cdot x}{y\cdot z\cdot z\cdot z\cdot z} = \frac{x^4}{yz^4}$$

Homework Questions?

Original Form	Factored Form	Simplified Exponent Form
$\frac{x^7}{x^3}$	$\frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x}$	x^4
$\frac{2^4}{2^2}$	$\frac{2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2}$	2^2
$\frac{3^4}{3^5}$	$\frac{3 \cdot 3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}$	$\frac{1}{3}$
$\frac{x^3y^2}{xy^2}$	$\frac{x \cdot x \cdot x \cdot y \cdot y}{x \cdot y \cdot y}$	x^2
$\frac{x^8y^5}{x^4y^2}$		x^4y^3

Do we notice a pattern?

By creating forms of 1 we can then see what we have left in the numerator and the denominator.

$\frac{x^2y^5}{x^4y^2} =$ 3 extra y's in the numerator; 2 extra x's in the denominator $= \frac{y^3}{x^2}$

$\frac{x^4y^3z^2}{x^5y^9z^2} =$ equal # of z's = 1; 1 extra x in denom; 6 extra y's in the denom $= \frac{1}{xy^6}$

$\frac{x^{13}y^{20}}{x^{25}y^2} =$ 18 extra y's in the numerator; 12 extra x's in denominator $= \frac{y^{18}}{x^{12}}$

5. Using the relationship you described above, can you rewrite $\frac{3^{58}}{3^{32}}$ without needing to factor the numerator and denominator? What is your simplified result?

$\frac{3^{58}}{3^{32}} = 3^{58-32} = 3^{26}$

6. Why are you able to use your strategy? Because it "gets you the correct result" is not the answer. ☺ What does using your strategy actually represent? (Hint: Think about forms of one.)

Removing any variables that are parts of forms of 1.

Part B

What happens when you have numerical coefficients? Copy and complete the table below in your notebook. Expand each expression into factored form and then rewrite it with new exponents as shown in the example. **All exponents must be positive and coefficients should be whole numbers.** Some of your simplified forms may still be in fractional form!

Original Form	Factored Form	Simplified Exponent Form
$\frac{12x^4y^3}{4x^2y^2}$	$\frac{12 \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y}{4 \cdot x \cdot x \cdot y \cdot y}$	$3x^2y$
$\frac{25x^7}{5^3}$	$\frac{25x^7}{5 \cdot 5 \cdot 5} = \frac{x^7}{5}$	$5x^7$ or $\frac{x^7}{5}$
$\frac{7x^3y^2}{7x^5y}$	$\frac{7 \cdot x \cdot x \cdot x \cdot y \cdot y}{7 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y} = \frac{y}{x^2}$	x^2y or $\frac{y}{x^2}$
$\frac{7x^3y^3}{3x^4y} \cdot 6x^2$		$14xy^2$
$\frac{12x^2y^4z^2}{9x^3y^2z}$		$\frac{4y^2z}{3x}$

$\frac{7x^3y^3}{3x^4y} \cdot \frac{6x^2}{1} = \frac{7 \cdot x^5y^3 \cdot 6^2}{3x^4y} = \frac{14xy^2}{1}$

$\frac{25x^7}{5^3} = \frac{5 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{5 \cdot 5 \cdot 5} = \frac{x^7}{5}$

$\frac{25x^7}{5 \cdot 5 \cdot 5} = \frac{25 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{5 \cdot 5 \cdot 5} = \frac{x^7}{5}$

Practice

$\frac{9^{12}}{9^8}$ 9^4

$\frac{m}{m^3}$ $= \frac{m}{m \cdot m \cdot m} = \frac{1}{m^2}$

$\frac{a^3b^5}{ab^2}$ $\frac{a^2b^3}{1}$

$\frac{m^7n^2}{m^3n^2}$ m^4

$$\frac{12n^5}{36n} \qquad \frac{12n^5}{36n} = \frac{1}{3}n^4 = \frac{n^4}{3}$$

$$\frac{32x^3y^2z^5}{-8xyz^2} \qquad -4x^2yz^3$$

$$\frac{-21w^5u^2}{7w^4u^5} \qquad \frac{-3w}{u^3}$$

Dividing Monomials

Simplify each monomial. Final answers must have positive exponents.

1) $\frac{16x^3}{10x}$

2) $\frac{24x^2}{12x^5}$

3) $\frac{16x^4y^2}{4xy^5}$

4) $\frac{15x^4}{25x^2y^5}$

5) $\frac{16x^2y^3}{32x^3y^2}$

6) $\frac{14x^4y^7}{16x^{12}y^2}$

7) $\frac{24x^4y^2}{9y^3}$

8) $\frac{25x^4y^4}{15xy^2}$

9) $\frac{4xy^6z^{12}}{12xy^2z^{16}}$

10) $\frac{64x^3z^7}{40xy^4z}$

11 $\frac{28a}{8a}$

12) $\frac{12p^5}{12p^4}$

13 $\frac{24x^4y^3}{28x^5y^3z}$

14) $\frac{16xyz}{48x^4z^3}$

Homework

Finish classwork