Warm Up

1/17

In your group:

- Compare answers for each section of the "Bar of Soap" worksheet.
- Have one person use all the answers and the yellow worksheet to figure out the riddle.

Some clarification from HW:

$$(-x^3)^3 = (-1 \cdot x^3)^3 = -1 \cdot x^9 = -x^9$$

$-x^3$ is really -1 times x^3

$$(-x^2)(x^4) = -x^6$$

$-x^2$ is really -1 times x^2, the exponent is only on the x.

Simplify the following:

$$\frac{\overset{4}{\cancel{12}}}{\underset{1}{\cancel{3}}} = \frac{4}{1} = 4$$

$$\frac{\overset{1}{\cancel{4}}}{\underset{5}{\cancel{20}}} = \frac{1}{5}$$

$$\frac{\overset{2}{\cancel{6}}}{\underset{5}{\cancel{15}}} = \frac{2}{5}$$

$$\frac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{7}}} = 1$$

form of 1
(FOO)

Did you know you can apply the same simplifying strategy here?

$$\frac{14}{5} \cdot \frac{3}{7} = \frac{14 \cdot 3}{5 \cdot 7} = \frac{\overset{2}{\cancel{14}} \cdot 3}{\underset{1}{\cancel{7}} \cdot 5} = \frac{6}{5}$$

can multiply in any order

$$\frac{28}{6} \cdot \frac{30}{7} = \frac{\overset{4}{\cancel{28}} \cdot \overset{5}{\cancel{30}}}{\underset{1}{\cancel{6}} \cdot \underset{1}{\cancel{7}}} = \frac{20}{1} = 20$$

Dividing Exponential Expressions

Part A

Emily was trying to simplify the exponent expression $\frac{5^7}{5^3}$. She started by writing out the factored forms in the numerator and the denominator. When she looked at this factored form, she noticed a "form of one" (FOO).

1. Write out the factored form of $\frac{5^7}{5^3}$. Where do you see any form(s) of one?

2. Discuss with your group **how you can use** forms of one to simplify Emily's expression. What did you decide? What is your simplified result?

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

Do we notice a pattern?

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

When working with the same base, subtract exponents

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

3 extra y's in the numerator

2 extra x's in the denominator

$$\frac{x^4y^3z^2}{x^5y^9z^2} = \frac{1}{xy^6}$$

$$\frac{x^{13}y^{20}}{x^{25}y^2} = \frac{y^{18}}{x^{12}}$$

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?

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.)

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
$\frac{12x^4y^3}{4x^2y^2}$	$\frac{12 \cdot x \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot \cancel{y} \cdot \cancel{y} \cdot y}{4 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y}}$	$3x^2y$
$\frac{25x^7}{5^3}$		
$\frac{7x^3y^2}{7x^5y}$		
$\frac{7x^3y^3}{3x^4y} \cdot 6x^2$		
$\frac{12x^2y^4z^2}{9x^3y^2z}$		

Homework

Finish classwork