Guiding Question: Can you use your knowledge of exponent rules to simplify exponential expressions?

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Warm-up: Complete the following problems in the space provided

#1 When you **Multiply Powers** with the same base, the base stays the same and you add the exponents.	#2 When you raise a **Power** to a **Power**, you multiply the exponents.	#3 When you raise a **Product** to a **Power**, you distribute the exponents to each factor.
$y^3 \cdot y^1 \cdot y^4$ y^8	$(y^8)^5$ y^{40}	$(4x^3)^2$ $4^2 \cdot (x^3)^2$ $16x^6$

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#4 When you **Divide Powers** with the same base, the base stays the same and you Subtract the exponents.	#5 When you raise a term to an **Exponent of Zero** the value is always 1.	#6 When a term is raised to a **Negative Exponent**, its position moves, and the exponent becomes positive
$\frac{x^3}{x^6}$ x^{-3} $\frac{1}{x^3}$	$(20x)^0 = 1$ $20x^0$ 20	$\frac{x^{-2}}{2} = \frac{1}{2x^2}$ $\frac{4}{x^{-3}} = \frac{4x^3}{1}$

$\frac{x \cdot x \cdot x}{x \cdot x \cdot x \cdot x \cdot x \cdot x}$

$\frac{1}{x^3}$

MUST KNOWS – EXPONENT RULES

Multiplying Powers	Power to a Power	Product to a Power	Negative Exponents
$(a^m)(a^n) =$ a^{m+n}	$(a^m)^n =$ $a^{m \cdot n}$	$(a^m b^n)^p =$ $a^{m \cdot p} b^{n \cdot p}$	$a^{-m} =$ $\frac{1}{a^m}$
Dividing Powers	**Quotient to a Power**	**Zero Exponent**	**Negative Exponents**
$\frac{a^m}{a^n} =$ a^{m-n}	$\left(\frac{a^m}{b^n}\right)^p = \left(\frac{a^{m \cdot p}}{b^{n \cdot p}}\right)$	$a^0 =$ 1	$\frac{1}{a^{-m}} =$ a^m

$\frac{1}{10} \neq \frac{10}{1}$

p. 13

Simplify the Exponential Expression

1) $2x^3y^1 \cdot 7x^1y^{-3}$

$\frac{14x^4}{y^2}$

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Simplify the Exponential Expression

2) $(2x^0yz^{-3})^3$

$(2)^3(y)^3(z^{-3})^3$

$$\frac{8y^3}{z^9}$$

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Simplify the Exponential Expression

3) $(4x^{-3}y^4)^{-2}$

$(4)^{-2}(x^{-3})^{-2}(y^4)^{-2}$

$4^{-2}x^6y^{-8}$

$$\frac{x^6}{4^2y^8}$$

$$\frac{x^6}{16y^8}$$

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Simplify the Exponential Expression

4) $\dfrac{15x^{0}}{3x^{-2}}$

$\dfrac{5 \cdot 3 \cdot x^{2}}{3}$

$5x^{2}$

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Simplify the Exponential Expression

5) $\left(\dfrac{3x^{5}}{2y^{3}}\right)^{2}$

$\dfrac{3^{2}x^{10}}{2^{2}y^{6}}$

$\dfrac{9x^{10}}{4y^{6}}$

1. Start stations activity