NAME: Joe

Math 7.2, Period 3/4

Mr. Rogove

Date: 8/25

LEARNING OBJECTIVE: We will multiply and divide different exponents with the same base. (G8M1L2)

CONCEPT DEVELOPMENT:

Multiplying Different Exponents with the Same Base:

What's the base??

$$x^m \cdot x^n = x^{m+n}$$

Examples:

$3^3 \cdot 3^4 = 3^{3+4} = 3^7$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^7$ (7 times)

$\left(-\frac{4}{5}\right)^3 \cdot \left(-\frac{4}{5}\right)^6 = \left(-\frac{4}{5}\right)^{3+6} = \left(-\frac{4}{5}\right)^9$

Non-Examples:

$3^6 \cdot 7^4$

Different bases

$(-2)^7 \cdot 2^5$

Diff. bases

$\frac{1000^5 \cdot 999^6}{7^2 \cdot 5^3}$

Dividing Different Exponents with the Same Base:

$$\frac{x^m}{x^n} = x^{m-n}$$

Examples

$\left(\frac{17^7}{17^4}\right) = 17^{7-4} = 17^3$

$\frac{17 \cdot 17 \cdot 17 \cdot 17 \cdot 17 \cdot 17 \cdot 17}{17 \cdot 17 \cdot 17 \cdot 17} = 17^3$

$\frac{\left(\frac{8}{5}\right)^{23}}{\left(\frac{8}{5}\right)^{12}} = \left(\frac{8}{5}\right)^{23-12} = \left(\frac{8}{5}\right)^{11}$

Non-Example

$\frac{12^4}{3^2}$

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Guided Practice:

Steps to Multiplying Different Exponents with the Same Base

1. Make sure that your terms all have the same base.
2. Rewrite the expression by adding the exponents with the same base.

$x^4 \cdot x^{34}$ $x^{4+34} = x^{38}$	$\left(\frac{3}{5}\right)^9 \cdot \left(\frac{3}{5}\right)^3$ $\left(\frac{3}{5}\right)^{12}$
$(-10)^3 \cdot (-10)^2 \cdot (-10)^6$ $(-10)^{3+2+6} = (-10)^{11}$	$3^3 \cdot 3^6 \cdot 3^{19} \cdot 3^{11}$
$(-4)^2 \cdot 17^5 \cdot (-4)^3 \cdot 17^7$ $(-4)^{2+3} \cdot 17^{5+7}$ $(-4)^5 \cdot 17^{12}$	$3^2 \cdot 2^3 \cdot 3^4 \cdot 2^4$ $3^{4+2} \cdot 2^{3+4} = 3^6 \cdot 2^7$
$3^7 \cdot 9$ $3^7 \cdot 3^2$ $3^{7+2} = 3^9$	$4 = 2 \cdot 2$ $2^3 \cdot 4^4$ $2^3 \cdot 2^1 \cdot 2^1 \cdot 2^1 \cdot 2^1 \cdot 2^1 \cdot 2^1 \cdot 2^1$ (4·4·4·4) 2^{11} ?
WHAT'S THE BASE? $(2x^3)(17x^7)$ $(2 \cdot 17)(x^3 \cdot x^7)$ $34x^{10}$	$(4y^7)(6y^3)$
$5^4 \cdot 2^{11}$ CANNOT COMBINE	$12^4 \cdot 25^2$

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Steps to Dividing Different Exponents with the Same Base

1. Make sure that your terms all have the same base.
2. Rewrite the expression by subtracting the exponents with the same base

$\frac{7^9}{7^6}$ $7^{9-6}=7^3$	$\frac{(-15)^5}{(-15)^2}$ $(-15)^3$
$\frac{\left(\frac{8}{5}\right)^{11}}{\left(\frac{8}{5}\right)^{2}}$	$\frac{\left(\frac{a}{b}\right)^{17}}{\left(\frac{a}{b}\right)^{11}}$
$\frac{2^9}{8^2}$ $(2\cdot2\cdot2)\cdot(2\cdot2\cdot2)\cdot(2\cdot2)$ $\frac{2^9}{8\cdot8}=\frac{2^9}{2^3\cdot2^3}=\frac{2^9}{2^6}=\boxed{2^3}$	$\frac{3^{23}}{27}$ 3^{20}
$\frac{2^5\cdot75^8}{2^2\cdot75^3}$ $2^3\cdot75^5$	$\frac{(-8)^{13}\cdot(-3)^{86}}{(-8)^3\cdot(-3)^2}$
$\frac{5}{x^3}\frac{(3x^8)}{1}=$ $\frac{15x^8}{1x^3}=\boxed{15x^5}$	$\frac{5}{x^3}(-4x^6)$ $\sqrt{}-20x^3\neq(-20x)^3$
$\frac{6}{x^7}(3x^8)$ $\frac{6}{x^7}\cdot\frac{3x^8}{1}=\frac{18x^8}{x^7}$ $18x$	$\frac{6}{x^5}(-15x^6)$

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Independent Practice:

$5^3 \times 25$	$\frac{2^{13}}{8}$
$5x^2 \cdot 3x^3 \cdot 2y^7$	$(-19)^5 \cdot (-19)^{11}$
$\frac{7^{10}}{7^3}$	$\frac{\left(-\frac{9}{7}\right)^m}{\left(-\frac{9}{7}\right)^n}$
$\frac{ab^3}{b^2}$	$2.7^4 \cdot 2.7^{18}$
$\left(\frac{1}{5}\right)^2 \cdot \left(\frac{1}{5}\right)^{15}$	$4x^7 \cdot 3x^{12}$

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Activating Prior Knowledge:

We know how to rewrite repeated multiplication:

3^3 $3\times3\times3$ ($3\times$)	3^4 $3\times3\times3\times3$ ($4\times$)

Closure:

Simplify: $23^a \cdot 23^b$

Teacher Notes:

Complete Ponzi Pyramid Scheme after this lesson