Created by Mr. Lischwe

Warmup $1/\left((-2)^4-(-2)^2\right)$

1) Make up your own exponent problem with an answer of a^6.

2) Is $\frac{3^{100}}{3^{99}}$ greater than, less than, or equal to 3? Explain your reasoning.

3) Verify that the problem in the date is correct.

FYI:

- If you are still missing your Midterm Corrections/Extension assignment, you will be working on it during lunch tomorrow.

EXAMPLES: DIVIDING

1. $\frac{a^{45}}{a^{22}}$ a^{23}
2. $\frac{6^5}{6^3}$ 6^2
3. $\frac{x^3y^5}{xy^2}$ $x^2 \cdot y^3$
4. $\frac{12j^5}{3j^2}$ $\frac{12 \cdot j \cdot j \cdot j \cdot j \cdot j}{3 \cdot j \cdot j} = 4j^3$

- ***WHEN YOU HAVE COEFFICIENTS, MULTIPLY OR DIVIDE THEM JUST LIKE NORMAL NUMBERS!!!***

Careful…

- $\frac{7x^5}{7x^3}$
- $\frac{7^5}{7^3}$

Helpful Hint

- WHEN IN DOUBT, EXPAND IT OUT!!!

A little harder…

1. $4a^2b^3 \cdot 7a \cdot 2b^5$

$= 4 \cdot a \cdot a \cdot b \cdot b \cdot b \cdot 7 \cdot a \cdot 2 \cdot b \cdot b \cdot b \cdot b \cdot b$

$= 56a^3b^8$

2. $\frac{6c^5 \cdot 3d^7}{9cd^4}$

$= \frac{6 \cdot c \cdot c \cdot c \cdot c \cdot \cancel{c}^{1} \cdot 3 \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot d \cdot d \cdot d}{9 \cdot \cancel{c}^{1} \cdot \cancel{d} \cdot \cancel{d} \cdot \cancel{d} \cdot \cancel{d}}$

$= \frac{18 \cdot c^4 \cdot d^3}{9}$ $= 2c^4d^3$

Super-Crazy Example

Simplify:

$$\frac{-2a^6 \cdot 6b^3 \cdot a \cdot 4b^5}{18b^4 \cdot a^5 \cdot 3b^2}$$

Table of Contents (2nd Semester)

Power to a Power

Objective:

Simplify expressions like $(x^5)^3$

CHALLENGE

- We are going to learn a new exponent rule today.
- Once again, I am not going to tell you the rule right away. I want to see if you can figure it out.
- I am going to display a bunch of problems on the board. Try to figure out how to do these problems. Then use them to figure out the rule for taking a power to a power.

Taking a power to a power

$(x^3)^4$ $(a^5)^2$ $(p^1)^6$

$(m^5n^2)^3$ $\left(\frac{b}{c^3}\right)^4$

$(3y^4)^2$ $\left(\frac{k^7}{4}\right)^3$

After you solve these, come up with some **rules** that you discover about how to take a power to a power.

2 ways to show $(a^5)^2$

Way 1

$(a^5)^2$
$= (a^5)(a^5)$
$= a^{10}$

Way 2

$(a^5)^2$
$= (a \cdot a \cdot a \cdot a \cdot a)^2$
$= (a \cdot a \cdot a \cdot a \cdot a)(a \cdot a \cdot a \cdot a \cdot a)$
$= a^{10}$

Taking a Power to a Power

- Keep the base, multiply the exponents

What if there's a coefficient?

$$(3y^4)^2$$

Predictions?

$= 3y^4 \cdot 3y^4$
$= 3 \cdot y \cdot y \cdot y \cdot y \cdot 3 \cdot y \cdot y \cdot y \cdot y$
$= 9y^8$

What did we learn?

The coefficient goes to the power outside the parentheses, just like any normal number.

Taking a Power to a Power

- Keep the base, multiply the exponents

DON'T MULTIPLY THE COEFFICIENTS TOO. TREAT THEM AS NORMAL NUMBERS!!!

Examples

1. $(x^2)^5 = (x^2) \cdot (x^2) \cdot (x^2) \cdot (x^2) \cdot (x^2) = x^{10}$

2. $(a^4b)^2 = (a^4b) \cdot (a^4b) = a^8b^2$

3. $(2m^3)^4 = (2m^3) \cdot (2m^3) \cdot (2m^3) \cdot (2m^3)$
$= (2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m)$
$= 16m^{12}$

4. $\left(\frac{5g^{50}}{6h^{30}}\right)^2$ $\left(\frac{5g^{50}}{6h^{30}}\right)^2$
$= \frac{25g^{100}}{36h^{60}}$

Find the perimeter and area of the square:

$5a^4$

Area = $l \cdot w$
Sides are the same in a square so we usually write:
Area = $s \cdot s$
Area = s^2
A = $(5a^4)^2$
A = $25a^8$

Perimeter = $s + s + s + s$
Perimeter = $4s$
P = $4 \cdot 5a^4$
P = $4 \cdot 5 \cdot a \cdot a \cdot a \cdot a$
P = $20a^4$

Once again…

- **WHEN IN DOUBT, EXPAND IT OUT!!!**

EXIT TICKET

- **Do these on a notecard. You may not get help from me, your classmates, or your notes.**

1) $8x^4 \cdot 4x^8$
2) $\frac{16y^7}{8y}$
3) $(3z^5)^3$

Homework (combined with yesterday's)

Textbook p. 35 (2-10 even, 20, 21)