Created by Mr. Lischwe

# Warmup $1/(2^2)^2$

1) If **a = -3**, **b = 6**, and **c = -4**, evaluate the expression.

$$a^3 - b^2 + 5c^2$$

2) Try to find values for **a** and **b** so that the equation $a^b = b^a$ is true. **A** and **b** may not be the same number.

# Extra question:

- **Would you rather have $2^{40}$ dollars or $40^{2}$ dollars?**

**A) I would rather have $2^{40}$ dollars.**

**B) I would rather have $40^{2}$ dollars.**

**C) It doesn’t matter, they’re the same**

# p. 27 (1-6, 8, 14-18)

1) $(-6)^7$

2) $-24a^{10}$

3) $-35a^5b^5c^5$

4) $8^2$ (or 64)

5) $2t^3$

6) $x^2y^5$

8) $4^1 \cdot 5^1 \cdot 6^1$ or $120$

14) 2

15) 9

16) 4

17) 6

18) 5

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# 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 (Problems like $(a^5)^2$)

- 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

*****TREAT COEFFICIENTS AS A NORMAL NUMBERS. TAKE THEM TO THE POWER OF THE EXPONENT!!!*****

**(The "pretend the variables aren't there" strategy)**

- $5p^4$

This coefficient is NOT connected to the 4 exponent

- $(5q^2)^4$

This coefficient IS connected to the 4 exponent

But the 5 is NOT connected to the 2 exponent

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

# Super-Crazy Example

$$\frac{x^3 \cdot \left(x^5 \cdot x\right)^2}{x^4 \cdot (x^3)^5 \cdot x} \cdot \frac{\left(\left(x^3\right)^2\right)^2}{x}$$

# 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) $\left(3z^5\right)^3$

# Homework

Textbook p. 35 (2-10 even, 14, 20, 21, 22)