WARM UP: Evaluate each of the following. **✱Use calculator!**

1) 3^3 **(3)(3)(3)**	2) (4)(4)(4)(4)	3) b^2 for $b=4$	4) $n^2 r$ for $n=3$ and $r=2$
$3\wedge 3 = \boxed{27}$	$4^4 = \boxed{256}$	$(4)^2 = \boxed{16}$	$(3)^2(2) = \boxed{18}$

NOTES   *I can... simplify expressions using the laws of exponents.*

MONOMIALS

What is a monomial? <u>An expression with ONE TERM</u>

give some examples: $\underbrace{5}_{\text{a constant}}$ $\underbrace{-3x}_{\text{coefficient variable}}$ $\underbrace{4x^2y}_{\text{coefficient w/bases.}}$

Multiplying Monomials

- **Step 1:** Multiply the <u>Coefficients</u>.

- **Step 2:** Use the **PRODUCT RULE** to simplify the

  <u>exponents</u> → **ADD** them!

PRODUCT RULE:
① Multiply Coef.
② Keep Base.
③ Add exponents

Directions: Use the product rule to simplify the following monomials.

1. $x^2 \cdot x^3$ x^5	2. $a^9 \cdot a^1$ a^{10}	3. $(4x^2) \cdot (3x^5)$ $12x^7$
4. $(3x^3)(5x^5)$ $15x^8$	5. $5x^2 \cdot 6x^4$ $30x^6$	6. $(-4a^3b)(3a^2b^5)$ $-12a^5b^6$

DIVIDING MONOMIALS

- **Step 1:** Divide the **Coefficients**.
- **Step 2:** Use the **QUOTIENT RULE** to simplify the exponents → **SUBTRACT**!

QUOTIENT RULE:
1. Divide Coef.
2. Keep Base
3. Subtract exponents.

Directions: Use the quotient rule to simplify the following monomials.

1. $\dfrac{x^5}{x^3}$ $\boxed{x^2}$

2. $\dfrac{k^8}{k^3}$ $\boxed{k^5}$

3. $\dfrac{m^3}{m^3} = m^0 = \boxed{1}$

4. $\dfrac{a^5 b^4}{a^1 b^3}$ $\boxed{a^4 b}$

5. $\dfrac{6x^4}{2x^3}$ $\boxed{3x}$

6. $\dfrac{14x^2 y^2}{7x y^1}$ $\boxed{2xy}$

Powers of Monomials

Example: $(4x^3)^2 = 4^2 x^6 = \boxed{16 x^6}$

- **Step 1:** Raise the **coefficient** to the outer exponent
- **Step 2:** Use the **POWER RULE** to simplify the exponents → **MULTIPLY** them!

–POWER RULE:
"Distribute" the outer exponents

Directions: Use the power rule to simplify the following monomials.

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

2. $(cd^2)^3$
$\boxed{c^3 d^6}$

3. $-4(mn^4)^3$
$-4(m^3 n^{12})$
$\boxed{-4m^3 n^{12}}$

4. $(2x^2 y)^5$
$2^5 x^{10} y^5 = \boxed{32x^{10} y^5}$