

Name: Key
Algebra I/II

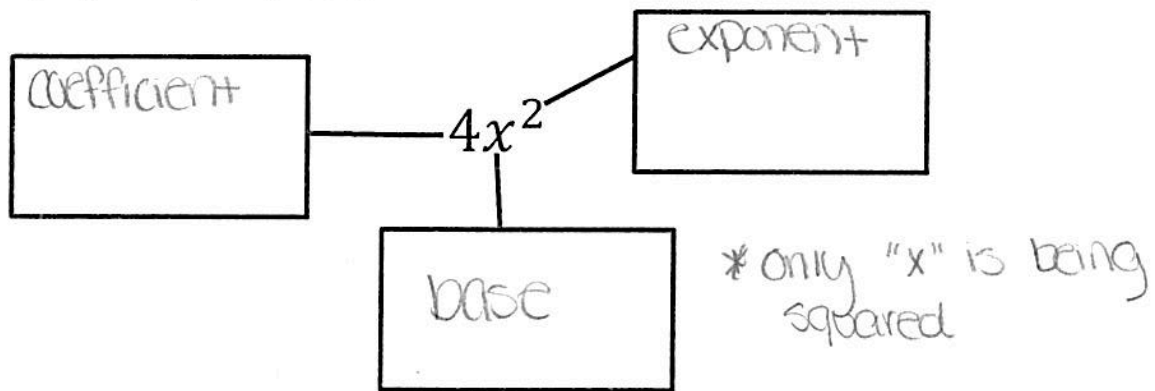
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Day 2- Laws of Exponents (with coefficients)

Do Now: Simplify the following expressions. All expressions should be expressed with a positive exponent.

1. $x^2(x^5)$ x^7 add exponents	2. $(y^7)^3$ y^{21} mult. exponents	3. $\frac{r^8}{r^4}$ r^4 subtract exp.	4. $x^4(y^4)$ Different bases \therefore Can't Simplify
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Vocabulary: Base, exponent, coefficient



Multiplication Rule

$$2x^4 * 3x^2$$

a. Expand the expression above.

$$2 \cdot x \cdot x \cdot x \cdot x \cdot 3 \cdot x \cdot x$$
$$2 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x = \boxed{6x^6}$$

b. Simplify the expression.

$$6x^6$$

c. Multiplication rule:

Multiply coefficients, keep bases, add exponents.

Division Rule

$$\frac{6x^{10}}{3x^2}$$

- a. Write the expression above in expanded form.

$$\frac{6 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{3 \cdot x \cdot x}$$

- b. Simplify the expression.

$$2x^8$$

- c. Division Rule:

Divide coefficients, keep base, subtract exponents

Power to Power Rule

$$(3x^3)^2 = 3^2 x^6$$

- a. Write the expression above in expanded form.

$$3x^3 \cdot 3x^3 = 3 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$$

- b. Simplify the expression.

$$9x^6$$

$$9(x^6)$$

- c. Power to Power Rule:

Multiply outside exponent with each exponent inside ().

$$\left(\frac{x}{y}\right)^2$$

- d. Write the expression above in expanded form.

$$\left(\frac{x^2}{y^2}\right)$$

- e. Simplify the expression.

- f. Power to Power Rule:

Multiply outside exponent with each exponent in numerator/denominator.

More Practice...

Simplify each expression and write each with a positive exponent.

<p>1. $\frac{10x^2}{x^4}$ $2-4=-2$ $10x^{\ominus 2}$ ← fraction $\frac{10}{x^2}$</p>	<p>2. $x^3y^5 \cdot x^7y^2$ $\boxed{x^{10}y^7}$ $7+3=10$ $5+2=7$</p>	<p>3. $(5x^3y^7)^8$ $\boxed{5^8x^{24}y^{56}}$ $3(8)=24$ $7(8)=56$</p>	<p>4. $\frac{x^4y^{10}}{x^{-2}y^{10}}$ $x^6y^0 = x^6(1) = \boxed{x^6}$ $4+2=6$ $10-10=0$</p>
<p>5. $(10x^5)(0.3y^2)$ $3x^7$ $5+2=7$</p>	<p>6. $(\frac{1}{3}x^9y^3)(30x^2)$ $\frac{1}{3}(30)x^{11}y^3$ $\boxed{10x^{11}y^3}$ $9+2=11$</p>	<p>7. $(3x)(xy)$ $3x^2y$</p>	<p>8. $(2x^4)^4$ $\boxed{16x^{16}}$ $24x^{16}$</p>
<p>9. $(3x^7y)^2$ $3^2x^{14}y^2$ $\boxed{9x^{14}y^2}$</p>	<p>10. $(2^2)^{19}(2^3)$ $2^{38}2^3$ $\boxed{2^{41}}$ $19(2)=38$ $38+3=41$</p>	<p>11. $\frac{(x^3)^4}{x^{10}}$ $\frac{x^{12}}{x^{10}} = x^2$ $12-10=2$</p>	<p>12. $x^{-2}(x^3)$ x $-2+3=1$</p>
<p>13. $\frac{6x^{-3}}{x^2} =$ $6x^{-5}$ $\boxed{\frac{6}{x^5}}$ $-3+2=-5$</p>	<p>14. $(\frac{x^2}{y})^4$ $\boxed{\frac{x^8}{y^4}}$ $4(2)=8$</p>	<p>15. $\frac{(10x^8)^4(y)^2}{x^7y^3}$ $\frac{10^4x^{32}y^2}{x^7y^3}$ $10000x^{25}y^{-1}$ $\boxed{\frac{10000x^{25}}{y}}$ $32-7=25$ $2-3=-1$</p>	<p>16. $\frac{(3x^3y)(2x^5y)}{6xy^{-2}}$ $\frac{6x^8y^2}{6xy^{-2}}$ $x^7y^0 = \boxed{x^7}$ $8-1=7$ $2-2=0$</p>