

LESSON 5-1 Operations with Polynomials

I can perform operations on polynomials expressions.

.....Using the properties of exponents.

monomial: a polynomial with one term² $5xy$
 $2(-3x^2)$ $-4y^2$ xyz^x $\frac{1}{2}x^2y^7$ $9526x^2$ $5x^2z$ $2 \cdot x^2 \cdot 3$

binomial: a polynomial with two terms
 $2x - 5$ $xyz - 5x^2z$ $5 + x$

trinomial: a polynomial with three terms

$$3x^2 + 4x - 7$$

$$\underbrace{2xy(2x - 7)}$$

$$2x - 7 + 5yz$$

A monomial expression is in simplified form when:

- There are no powers of powers
- Each base appears exactly once
- All fractions are in simplest form
- There are no negative exponents

$$(x^2)^4$$

$$2xyx$$

$$\frac{4^2}{10^2} \text{ enter, math, enter, } \frac{2}{5}$$

Multiply & Divide MONOMIALSAKA: Exponent Properties (Use the graphic organizer)

1. Product Property $a^m a^n = a^{m+n}$ ~~XXXXXXXXXX~~
 $k^4 k^2 = \underbrace{kkkk}_{k^4} \underbrace{kk}_{k^2} = k^6$ $k^{4+2} = k^6$

$$(2k^4)(4k^2) = 8k^6$$

$$\textcircled{1} (4x^2y)(-2x^3y^7) = -8x^5y^8$$

$$\textcircled{2} (j^2k^4)(j^3k^{-1}) = j^5k^3$$

Quotient Property $X^{5-3} = X^2$

$$\frac{X^5}{X^3} = \frac{\overbrace{XXXXX}^5}{\underbrace{XXX}_3} = X^2$$

$$\frac{X^3}{X^5} = \frac{\overbrace{XXX}^3}{\underbrace{XXXXX}_5} = \frac{1}{X^2} \quad X^{3-5} = X^{-2}$$

$$\frac{y^{\cancel{10}^6}}{\cancel{1}y^{\cancel{4}}} = y^6$$

$$\frac{\cancel{x^3} \cancel{y^5}}{\cancel{1}x^{\cancel{2}} \cancel{y^{\cancel{8}^3}}} = \frac{x^1}{y^3}$$

2. Quotient Property $\frac{a^n}{a^m} = \cancel{a^m}^m$

a. $\frac{2k^9}{6k^7}$

b. $\frac{k^7}{k^3}$

c. $\frac{j^2k^4}{6j^5k^7}$

3. Negative Exponents $\frac{1}{a^{-1}} = a$ and $\frac{1}{a} = a^{-1}$

a. $x^{-6} = \frac{1}{x^6}$ b. $\frac{k^{-3}}{k} = \frac{1}{k^3 k} = \frac{1}{k^4}$

c. $\frac{1}{k^{-2}} k^2$ d. $\frac{(3xyz^7)^{-1}}{1} = \frac{1}{(3xyz^7)^1}$

$\frac{4k^{-1}m^3n^{-2}}{8k^2m^{-4}n^5} = \frac{4m^3m^4}{8kk^2n^5n^2} = \frac{1m^7}{2k^2n^7}$

4. Power of a Power $(a^m)^n = a^{mn}$

a. $(x^3)^4 = x^3 x^3 x^3 x^3 = x^{12}$

b. $(x^{-2})^6 = x^{-12} = \frac{1}{x^{12}}$

c. $(k^{x-2})^3 = \underbrace{k^{x-2}} \underbrace{k^{x-2}} \underbrace{k^{x-2}} = k^{3x-6}$

5. Power of a Product $(ab)^n = a^n b^n$

a. $(rd)^3$

b. $(3k^4)^3$

c. $(4j^{-2}k^4)^5$

Combine the last two:

7. Power of a Power & Power of a Product

$$(a^x b^y)^k =$$

$$(4^2 x^{-6} y^3 z)^3$$

8. Power of a Quotient $\left(\frac{a}{b}\right)^n = \left(\frac{a^n}{b^n}\right)$

$$\left(\frac{x}{y}\right)^3$$

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

$$\left(\frac{\cancel{24}j^2k^4}{\cancel{12}j^3k^{-1}}\right)^2$$

$$\left(\frac{2k^4k}{j}\right)^2 \left(\frac{2k^4k}{j}\right) = \frac{4k^{10}}{j^2}$$

9. Zero Exponents $a^0 = 1$

ANYTHING to the zero power will be 1 !!!

$$\frac{k^1}{k^1} = 1$$

$$k^{1-1} = k^0$$

a. $k^0 =$

b. $(2k^{-4})^0$

c. $\left(\frac{1}{j^3k^{-2}}\right)^0$

Watch OUT:

$$2x^0 = 2 \cdot 1 = 2$$

$$(2x)^0 = 1$$

$$(2x^{-3}y^3)(-7x^0y^{-6}) = 2(-7)x^{-3}x^0y^3y^{-6}$$

$$\frac{15c^5d^3}{-3c^2d^7}$$

Homework

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