

Math 3 Warm-Up

Simplify each expression.

$$(5p^2 - 3) + (2p^2 - 3p^3)$$

$$-3p^3 + 7p^2 - 3$$

$$(4 + 2n^3) + (5n^3 + 2)$$

$$7n^3 + 6$$

$$2) (a^3 - 2a^2) + (3a^2 + 4a^3)$$
$$5a^3 - 5a^2$$

$$4) (4n - 3n^3) + (3n^3 + 4n)$$
$$-6n^3$$



Monomial:

3, x, 2xy

a number, variable, or the product of a number and one or more variables with whole number exponents.



Degree of a Monomial:

$$2x^2 = 2$$


the sum of the exponents of its variables.



Polynomial:

$$2x + 3, 2x^3 - 3x + 2$$

when one or more monomials are added or subtracted together.



Binomial: 2 monomials

$$2x^2 + x$$



Trinomial: 3 monomials

$$2x^3 + 3x + 6$$

Degree of a Polynomial:

the degree of a monomial with the greatest degree.

$$2x^3 + 3x^2 + 6$$

degree: 3



5) $4ab^3c^4$
 - 1 term
 - degree: 4

6) $4+x^1$
 - 2 terms
 - degree: 1
 $(x+4)$

7) $3-x^2+5y^4x$
 - 3 terms
 - degree: 4
 $-x^2+5y^4x+3$

8) $4+y^3-2y^5-8y^2+y$
 - 5 terms
 - degree: 5
 $-2y^5+y^3-8y^2+y+4$

Notes: Properties of Exponents

III

Negative Exponents: $a^{-n} = \frac{1}{a^n}$ Also, $\frac{1}{a^{-n}} = a^n$

13) $x^{-5} = \frac{1}{x^5}$

14) $x^2y^{-3} = \frac{x^2}{y^3}$

15) $x^{-2}y^5z^{-3}$

$a^{-b} = \frac{1}{a^b}$, $\frac{1}{a^{-b}} = a^b$

I

Multiplying Powers: $a^m \cdot a^n = a^{m+n}$

1) $y^7 \cdot y^5 = y^{12}$

2) $n^4 \cdot n^3 \cdot n^2 = n^9$

16) $x^2y^{-2}z^3$

$\frac{y^5}{x^2z^3}$

3) $2^3 \cdot 2^4y^2 = 2^7y^2$

4) $v^3 \cdot v^{15} \cdot v^{18} = v^{46}$

II

Dividing Powers: $\frac{a^m}{a^n} = a^{m-n}$

$\frac{a^b}{a^c} = a^{b-c}$

9) $\frac{x^6}{x^5} = x$

10) $\frac{x^5y^3}{x^2y^2} = x^3y$

11) $\frac{32x^5y^5}{16x^2y^3} = 2x^3y^2$

~~$\frac{x \cdot y \cdot y \cdot y \cdot y \cdot z}{y \cdot y \cdot y \cdot y \cdot z}$~~

12) $\frac{xy^4z^2}{yz} = xz$

IV. Power of a Power: $(a^m)^n = a^{m \cdot n}$ (a^m)ⁿ = $a^{m \cdot n}$
 V. Power of a Product: $(ab)^m = a^m \cdot b^m$ (ab)^m = $a^m \cdot b^m$
 Examples: 1) $(g^4)^2 = g^8$ (g^4)² = g^8 2) $(3u)^3 = 27u^3$ ($3u$)³ = $27u^3$ 3) $(2x)^2(4y)^2 = 4x^2(16y^2) = 64x^2y^2$ ($2x$)²($4y$)² = $4x^2(16y^2)$ = $64x^2y^2$

VI. Power of a Quotient: $(\frac{a}{b})^n = \frac{a^n}{b^n}$ Also, $(\frac{b}{a})^{-n} = \frac{a^n}{b^n}$
 Examples: 1) $(\frac{1}{w^4z^2})^3$ 2) $(\frac{cd}{3})^{-2}$ 3) $(\frac{-6x^6}{3x^3})^3$

VII. Power of Zero: $a^0 = 1$ (a)⁰ = 1 ($a \neq 0$)
 25) $r^0 = 1$ (r)⁰ = 1 26) $c^3 d^0 e^2 = c^3 e^2$ ($c^3 d^0 e^2$) = $c^3 e^2$ 27) $(xyz)^0 = 1$ (xyz)⁰ = 1

Polynomials & Exponents

Simplify the following expressions using exponent rules.

1. _____ $\frac{28a^{14}b^2c^{12}}{14a^9b^{13}c^5}$

6. _____ $\frac{12j^2k^{11}m^6}{48j^4k^8m^3}$

3. _____ $7x^6y^3 \cdot 3xy^2$

7. _____ $w^3x^{-2}y^{-5}z^6$

4. _____ $x^{11} \cdot x^3 \cdot x$

9. _____ $\frac{a^{-2}bc^3}{a^6b^5c^{-7}}$

5. _____ $(a^5bc^2)^0$

10. _____ $\frac{a^{-4}b}{a^{10}bc^{-8}}$

11. _____ $\frac{x^{-4}}{x^{-6}}$