BellWork

Simplify:

$$\frac{-\boxed{6}^{\cancel{0}}}{3m^2} = \frac{-1}{3m^2}$$

$$\frac{x^{10}}{x^{-2}} = x^{10++2} = x^{12}$$

$$\frac{\cancel{12}^{3}}{1}(3/4)$$

$$\left(\frac{x^{12}}{y^4}\right)^{\frac{3}{4}} = \frac{x^9}{y^3}$$

$$\frac{\cancel{4}}{1}(3/\cancel{4}) = 3$$

(-3)^3(-3)^4

$$(-3)^7 = -2187$$

Polynomial function

$$f(x) = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_1 x + a_0$$

leading coefficient: a_n

degree: n

constant term: a_0

$$f(x) = 3x^5 - 7x^4 + 3x^3 - 8x^2 + x^1 - 20$$

$$f(x) = -27x^{10} + 9$$

Degree	Type	Example
0	Constant	$f(x)=5x^0$ $f(x)=5$ $y=-20$
1	Linear	$f(x)=3x^1+5$ $y=x$
2	Quadratic	$f(x)=7x^2-3x+1$ $y=5x^2-3$
3	Cubic	$f(x)=x^3$
4	Quartic	$f(x)=7x^4-10x^2+1$ $y=x^4$
5	Quintic	$y=x^5$

What if the expression has more than 1 variable, how do you find the degree?

x^2+3x+1 polynomial degree 2

$\underbrace{x^2y^1}_{\text{degree 3 term}} + 3\underbrace{x^1y^4}_{\text{degree 5 term}}$ Not polynomial

degree 5

Polynomials can also be classified by the number of terms as well as its degree.

monomial	binomial	trinomial
1 term	2 terms	3 terms
5	$m+7$	x^2-3x-9
m^3	$m^{20}+m^{10}$	x^7-10x^4+3
$5m^3$	$5x+7$	

Polynomial Function ☺ (WHOLE # Exponents for the variables)

(in standard form the powers are decreasing)

Leading Coefficient is # in the front of the polynomial if it is in <u>standard form</u>.

Remember for the variables only

- No Negative Exponents on the variables
- No Variable Exponents
- No Fractional Exponents on the variables

Identify whether the following are polynomials.

If it is a polynomial state the degree, type, leading coefficient, and constant.

1. $g(x) = 1x^4 - \frac{1}{4}x^2 + 3$

polynomial quartic

LC: 1

constant: 3

2. $k(x) = 7x - \sqrt{3} + \pi x^2$

polynomial $K(x) = \pi x^2 + 7x - \sqrt{3}$ quadratic

L.C.: π constant: $-\sqrt{3}$

3. $f(x) = 5x^2 + 3x^{-1} - x$

Not polynomial

4. $h(x) = x + 2^x - .6x^5$

Not polynomial

Add or subtract the following polynomials.

1. $(\cancel{2y^2} - \cancel{5y} + \cancel{1}) + (\cancel{y^2} - \cancel{y} - \cancel{4})$

$3y^2 - 6y - 3$

2. $(\cancel{5x^4} - \cancel{2x^3} + \cancel{9}) - (-2x^4 + 8x^2 - x + 2)$

$7x^4 - 2x^3 - 8x^2 + x + 7$

Find the sum, the difference or fill in the $\square$ with the missing information.

3. $(\cancel{4x^5} + \cancel{3x^4} - \cancel{5x} + \cancel{1}) + (-\cancel{x^3} + -\cancel{2x^4} + \cancel{x^5} + -\cancel{1})$

$5x^5 + x^4 - x^3 - 5x$

4. $(\cancel{2y^2} + \boxed{-6}y + 1) + (\cancel{y^2} - 4) = \boxed{3}y^2 - 6y - 3$

Find the product

4. $2x^3(5x-1)$

$10x^4 - 2x^3$

5. $(2x - 4)(3x + 1)$

$6x^2 + \underbrace{2x - 12x}_{} - 4$

$6x^2 - 10x - 4$

6. [redacted] $- 1)(y^2 + 6y - 3)$

$y^3 + 6y^2 - 3y$

$-y^2 - 6y + 3$

$y^3 + 5y^2 - 9y + 3$

7. ([redacted] + [redacted] $+ 1)(x^2 - 8x + 3)$

$-x^4 + 8x^3 - 3x^2$

$4x^3 - 32x^2 + 12x$

$x^2 - 8x + 3$

$-x^4 + 12x^3 - 34x^2 + 4x + 3$

8. $(x+4)(x-6)(x-5)$

$(x+4)(x^2-5x-6x+30)$

$(x+4)(x^2-11x+30)$

x^3-11x^2+30x

$4x^2-44x+120$

$x^3-7x^2-14x+120$

$(2\cdot 3)\cdot 4$

$6\cdot 4=24$

$2\cdot(3\cdot 4)$

$2\cdot 12=24$

9. $(2c+5)^2$

$(2c+5)(2c+5)$

$4c^2+10c+10c+25$

$4c^2+20c+25$

10. $(5p-3)(5p+3)$

$25p^2+15p-15p-9$

$25p^2-9$

11. $(2x + 1)^3$

$(2x+1)(2x+1)(2x+1)$

$(2x+1)(4x^2+2x+2x+1)$

$(2x+1)(4x^2+4x+1)$

$8x^3+8x^2+2x$

$4x^2+4x+1$

$8x^3+12x^2+8x+1$

Find two polynomials with a sum and product that have the following degrees. If you cannot find the polynomials, explain why.

a) sum degree 4 and product is degree 4

4, 3, 2, 1, 0

$x^{\boxed{4}} + x^{\boxed{0}} = x^4$ $\qquad$ x^4 & x^0

$x^{\boxed{4}} \cdot x^{\boxed{0}} = x^4$

b) $\underbrace{\text{sum degree 3}}$ and product is degree 5

$$x^{\boxed{3}} + x^{\boxed{2}} = x^3$$

$$x^{\boxed{3}} \cdot x^{\boxed{2}} = x^5$$

x^3 & x^2

c) $\underbrace{\text{sum degree 2}}$ and $\underbrace{\text{product degree 1}}$

$$x^{\boxed{2}} + x^{\boxed{-1}} = x^2$$

$$x^{\boxed{2}} \cdot x^{\boxed{-1}} = x^1$$

Not possible