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First test Wednesday Feb. 20th 2019
Material covered will be P-2 and P-3

Polynomials

Parts of a polynomial are called "terms."

I. Distinguished by the number of terms

A. $3x$ - Monomial

B. $5x+7$ - Binomial

C. x^2-3x+4 - trinomial

D. A polynomial of 10 to 19 terms

Really big a nomial

E. A polynomial of 20 or more terms

Gigantobiganomial

II. Distinguished by their degree

Def of degree — the largest exponent in any term of the polynomial

ex. $7x^{\textcircled{5}}-5x^3+2x-9$ the degree is 5.

Standard form - Decreasing order of exponents

Ex: $x^3 - 5x^7 + 2x^2 - 4$ - not standard form

$-5x^7 + x^3 + 2x^2 - 4$ - Standard form

Leading term - 1st term when in standard form.

Ex: $5x^7 + 3x^3$ leading term is $5x^7$

Leading Coefficient - Coefficient of the leading term

Ex: $7x^7 + 5x^2 + 4x - 5$ leading coeff is 7

Polynomials require positive interger exponents

Positive Intergers are whole numbers. $\{1, 2, 3, 4, \ldots\}$

Ex: $7x^{1/2} - x^{1/4}$ - not a polynomial since $1/2$ and $1/4$ are not intergers

$7x^{-2} - x^3$ - not a polynomial since -2 is not a positive interger.

$7x^7 - 9x^5$ - is a polynomial since 7 and 5 are positive and intergers.

Webassign examples

For webassign if it is not a polynomial answer NP.

Ex) $\frac{x^2 - 2x - 4}{9}$ — This is in standard form since the exponents are in decreasing order, the exponents are positive integers, and we have no rule against fractions.

Ex) $y^2 - \sqrt{y} =$

$= y^2 - y^{1/2}$

Since $\sqrt{}$ is not an exponent we rewrite it. Then we can see that one of the exponents, $1/2$, is not an interger. So this is not a polynomial.

Adding Polynomials

$(3x + 7) + (2x - 4) =$ (Like terms: $3x$ and $2x$; Like terms: 7 and -4)

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

$= 5x + 3$

Like terms

1) Same variable

2) Same exponent

$5x^2 + 2x$ not like terms Since not the same exponents.

Subtracting Polynomials

$(3x+7)-(2x-4)=$

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

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

$=1x+11$

$=x+11$

Multiplying Polynomials

Ex 1)

$3x^2 \cdot 5x = 15x^3$

Ex 2)

$(2x+5)(3x-2) = (2x\cdot 3x)+(2x\cdot -2)+(5\cdot 3x)+(5\cdot -2)$

use the F.O.I.L method $= 6x^2-4x+15x-10$

$= 6x^2+11x-10$

Ex 3)

$(2x+5)(2x-5) = (2x\cdot 2x)+(2x\cdot -5)+(2x\cdot 5)+(5\cdot -5)$

Notice these look like conjugates. $= 4x^2-10x+10x-25$

$= \underbrace{4x^2-25}$

Difference of Squares

Ex 4)

$(2x+5)^2 \neq 4x^2 + 25$

$(2x+5)^2 = (2x+5)(2x+5) = 4x^2 + 10x + 10x + 25$

$= \underbrace{4x^2 + 20x + 25}$

Perfect Square trinomial

Webassign Questions

$y^2(7y^2 - 9y - 1) = (y^2 \cdot 7y^2) - (y^2 \cdot 9y) - (y^2 \cdot 1)$

$= 7y^4 - 9y^3 - y^2$

$(8 - 1.5y)(3y^3) = (8 \cdot 3y^3) - (1.5y \cdot 3y^3)$

$= 24y^3 - 4.5y^4$ - not in standard form

$= -4.5y^4 + 24y^3$

$(3a+4b)(3a-4b) = 9a^2 - 16b^2$

$$(x^2 - x + 7)(x^2 + x + 7) = (x^2 \cdot x^2) + (x^2 \cdot x) + (x^2 \cdot 7) + (-x \cdot x^2) + (-x \cdot x$$

$$+ (-x \cdot 7) + (7 \cdot x^2) + (7 \cdot x) + (7 \cdot 7)$$

$$= x^4 + x^3 + 7x^2 - x^3 - x^2 - 7x + 7x^2 + 7x + 49$$

$$= x^4 + 13x^2 + 49$$