2-1 Operations with Polynomials

Objectives:

- I can identify the parts of a polynomial

- I can perform operations with polynomials including addition, subtraction, and multiplication

Vocabulary

Monomial: single term
Ex: -17
Ex: $2x$
Ex: $-6x^3y^2z$

Binomial: polynomial w/ 2 terms
Ex: $x+3$ Ex: $x+z$ Ex: x^4-7

Trinomial: polynomial w/ 3 terms
Ex: $2x^2+3x+1$ Ex: $x+y+z$

Polynomial: at least two terms separated by $+, -$. Ex: $3x^3+x+x^4-1$

Like Terms

$\frac{3}{8}, 2$

$2x, x$

$-y^2x, 7y^2x$

$z^4a^2b, -5z^4a^2b$

$5xy+y$ NOT like terms

Monomials

Identify the monomials x^3 $y + 3y^2 - 5y^3 + 10$ a^2bc^{12} 76

Monomials: _____ → degree: 3

Not monomials: _____

Identify the degree of each monomial.

Monomial	x^3	a^2bc^{12}	$76x^0$
Degree	3	15	0

$x^9 - 23x^7 - 6x^3 + 2x^2 + 10$

deg: 9

LC: 1

(8) $(-2x + 23x^5 + 11) + (-5 + 9x^3 + x)$

$23x^5 + 9x^3 - 3x + 6$

Polynomials pg. 315

Identify the terms of the polynomial $y + 3y^2 - 5y^3 + 10$. _____

Identify the coefficient of each term.

Term	y	$3y^2$	$-5y^3$	10
Coefficient				

Identify the degree of each term.

Term	y	$3y^2$	$-5y^3$	10
Degree				

Write the polynomial in standard form. _____

What is the leading coefficient of the polynomial? _____

Adding Polynomials pg. 316

Ex 1 $(4x^2 - x^3 + 2 + 5x^4) + (-x + 6x^2 + 3x^4)$

$5x^4 \quad -x^3 \quad +4x^2 \quad +2$

$+3x^4 \quad +6x^2 \quad -x$

Ex 2 $(10x - 18x^3 + 6x^4 - 2) + (-7x^4 + 5 + x + 2x^3)$

Add the following polynomials pg. 316

$(17x^4 + 8x^2 - 9x^7 + 4 - 2x^3) + (11x^3 - 8x^2 + 12)$

$(-8x + 3x^{11} + x^6) + (4x^4 - x + 17)$

Subtracting Polynomials pg. 317

$(12x^3 + 5x - 8x^2 + 19) - (6x^2 - 9x + 3 - 18x^3)$

Write in standard form.

Align like terms and add the opposite.

Add.

$$\begin{array}{rrrr} 12x^3 & -8x^2 & +5x & +19 \\ +18x^3 & -6x^2 & +9x & -3 \\ \hline \end{array}$$

$(-4x^2 + 8x^3 + 19 - 5x^5) - (9 + 2x^2 + 10x^5)$

Subtract the following polynomials pg. 317

$(23x^7 - 9x^4 + 1) - (-9x^4 + 6x^2 - 31)$

$(7x^3 + 13x - 8x^5 + 20x^2) - (-2x^5 + 9x^2)$

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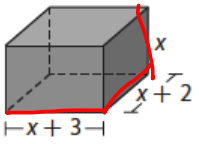
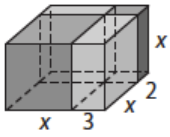
The data from the U.S. Census Bureau for 2005–2009 shows that the number of male students enrolled in high school in the United States can be modeled by the function $M(x) = -10.4x^3 + 74.2x^2 - 3.4x + 8320.2$, where x is the number of years after 2005 and $M(x)$ is the number of male students in thousands. The number of female students enrolled in high school in the United States can be modeled by the function $F(x) = -13.8x^3 + 55.3x^2 + 141x + 7880$, where x is the number of years after 2005 and $F(x)$ is the number of female students in thousands. Estimate the total number of students enrolled in high school in the United States in 2009.

In the equation $T(x) = M(x) + F(x)$, $T(x)$ is the total number of students in thousands.

Pg. 327

V = length × width × height
$= (x+3)(x+2)x$





Identify the volume of:

$(x+3)(x+2)x$

$(x+3)(x^2+2x)$

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

$x^3 + 5x^2 + 6x$

Multiplying Polynomials pg. 328

$5x \cdot 6x^3 = 30x^{1+3}$

$= 30x^4$

$-2x^2y^4z \cdot 5y^2z = -10x^2y^{4+2}z^{1+1}$

$= -10x^2y^6z^2$

$$\begin{aligned}(2+3x)(1+x) &= 2(1+x) + 3x(x+1)\\ &= 2(1) + 2(x) + 3x(x) + 3x(1)\\ &= 2 + 2x + 3x^{1+1} + 3x\\ &= 2 + 5x + 3x^2\end{aligned}$$

Pg. 328

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

Find the product by multiplying horizontally.

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

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

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

$2x^3 - 7x + 2$

Therefore, $(x+2)(2x^2-4x+1) = 2x^3 - 7x + 2$.

Pg. 329

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

$$-7x^2+x+2$$
$$\times \quad 3x-4$$

Multiply the following polynomials pg. 329

$(3+2x)(4-7x+5x^2)$

$12-21x+15x^2+8x-14x^2+10x^3$

$10x^3+x^2-13x+12$

$(x-6)(3-8x-4x^2)$

Multiplying with a table

$(x^2+3x-5)(x^2-x+1)$

	x^2	$-x$	1
x^2	x^4	$-x^3$	x^2
$+3x$	$3x^3$	$-3x^2$	$3x$
-5	$-5x^2$	$5x$	-5

$x^4+2x^3-7x^2+8x-5$