2-1 Operations with Polynomials

(Book 6.1/6.2 pgs. 315-329)

Objectives:

- I can identify the parts of a polynomial

- Icanperformoperationswithpolynomials includingaddition,subtraction,and multiplication

Vocab

Monomial $3x^2$

Binomial $3x^2 - 1$

Trinomial $x^2 + 4x + 4$

Polynomial $7x^{13} + 2x^2 + x + 4$

Monomials pg. 315

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

Monomials: x^3, 76, a^2bc^{12}

Not monomials: $y + 3y^2 - 5y^3 + 10$

Identify the degree of each monomial.

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

Polynomials pg. 315

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

Identify the coefficient of each term.

Term	y	$3y^2$	$-5y^3$	10
Coefficient	1	3	-5	10

Identify the degree of each term.

Term	y	$3y^2$	$-5y^3$	10
Degree	1	2	3	0

Write the polynomial in standard form. $-5y^3 + 3y^2 + y + 10$

What is the leading coefficient of the polynomial? -5

Adding Polynomials pg. 316

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

$$\begin{array}{rrrrr} 5x^4 & -x^3 & +4x^2 & & +2 \\ +3x^4 & & +6x^2 & -x & \\ \hline 8x^4 & -x^3 & +10x^2 & -x & +2 \end{array}$$

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

$-x^4 - 16x^3 + 11x + 3$

Add the following polynomials pg. 316

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

$-9x^7 + 17x^4 + 9x^3 + 16$

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

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.

$$\begin{array}{rrrr} 12x^3 & -8x^2 & +5x & +19 \\ +18x^3 & -6x^2 & +9x & -3 \\ \hline 30x^3 & -14x^2 & +14x & +16 \end{array}$$

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

Write in standard form and add the opposite.

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

Group like terms

Add

$-15x^5 + 8x^3 - 6x^2 + 10$

Subtract the following polynomials pg. 317

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

$23x^7 - 6x^2 + 32$

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

$-6x^5 + 7x^3 + 11x^2 + 13x$

Pg. 318

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.

$T(x) = -10.4x^3 + 74.2x^2 - 3.4x + 8320.2$

$+ \quad -13.8x^3 + 55.3x^2 + 141x + 7880$

$T(x) = -24.2x^3 + 129.5x^2 + 137.6x + 16,200.2$

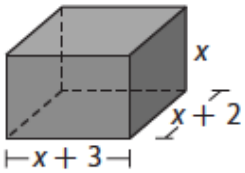
$T(4) = -24.2(4)^3 + 129.5(4)^2 + 137.6(4) + 16,200.2$

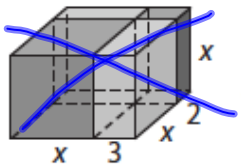
$\approx 17,273.8$ thousand students

Pg. 327

V = length × width × height

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





Identify the volume of:

$V = (x+3)(x+2)x$

$V = (x^2 + 2x + 3x + 6)x$

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

So the volume of the rectangular prism is the sum of the volumes of the four smaller regions.

$V_1 + V_2 + V_3 + V_4 = \square + \square + \square + \square$

$= \square$

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

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

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

$28x^2-4x-8$

$-21x^3+3x^2+6x+0$

$-21x^3+31x^2+2x-8$

Multiply the following polynomials pg. 329

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

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

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

$-4x^3+16x^2+51x-18$

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

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