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 — ONE TERM

Binomial — TWO TERMS

Trinomial — THREE TERMS

* Polynomial — any # of terms

Like Terms — Same variables } Same degree (exponent)

Monomials

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

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

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

$76x^0$

Identify the degree of each monomial.

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

DEGREE MONOMIAL: all exponents added

DEGREE POLYNOMIAL: degree highest term

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.

in front variable

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

Identify the degree of each term.

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

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

highest → lowest degree

What is the leading coefficient of the polynomial? -5

Coefficient of term with highest degree

Adding Polynomials pg. 316

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

$$\begin{array}{cccccc} 5x^4 & -x^3 & +4x^2 & & +2 \\ +3x^4 & & +6x^2 & -x & \end{array}$$

$$8x^4 - x^3 + 10x^2 - x + 2$$

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

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

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

Add the following polynomials pg. 316

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

$17x^4 + 8x^2 - 9x^7 + 4 - 2x^3$

$11x^3 - 8x^2 + 12$

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

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

$-8x + 3x^{11} + x^6$

$4x^4 - x + 17$

$3x^{11} + x^6 + 4x^4 - 9x + 17$

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.

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

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

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

$+ (-9 - 2x^2 - 10x^5)$

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

Subtract the following polynomials pg. 317

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

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

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

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

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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.

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

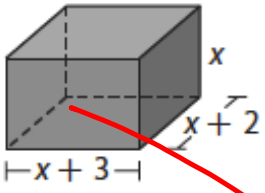
$+$

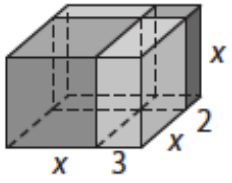
$F(x) =$

$T(x)$

$V = \text{length} \times \text{width} \times \text{height}$
$= (x+3)(x+2)x$

Pg. 327





Identify the volume of:

V_1

V_2

V_3

V_4

Multiplying Polynomials pg. 328

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

$= 30x^4$

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

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

$5 \cdot x \cdot 6 \cdot x \cdot x \cdot x$

$30x^4$

$(2 + 3x)(1 + x) = 2(1 + x) + 3x(x + 1)$

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

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

$3x^2 + 5x + 2$

Pg. 328

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

Find the product by multiplying horizontally.

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

$2x^3 - 7x + 2$

Pg. 329

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

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

$28x^2-4x-8$

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

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

$$321$$
$$\times \quad 21$$

Multiply the following polynomials pg. 329

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

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

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

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