

Sec. 8.1 Adding and Subtracting Polynomials

monomial : 5, x , $5xy^2$

degree : add the exponents of the variables

$$\text{ex: } 5x^2y^3 \rightarrow 5 \quad 7 \rightarrow 0$$

$$x^1y^2 \rightarrow 3 \quad 7x^0$$

$$6x \rightarrow 1$$

$$\frac{1}{2}x^2 \rightarrow 2$$

Standard form : degree of terms decrease

$$\text{ex: } 3x^2 - 2x + 4x^3 - 7 \rightarrow$$

$$\text{SF: } 4x^3 + 3x^2 - 2x - 7$$

Degree of a polynomial : same as the degree of the monomial with the highest degree

$$\text{ex: } \underset{6}{7}x^6 - \underset{2}{3}x^2 + \underset{0}{2} \rightarrow 6$$

Degree :

Degree	degree	ex:	# of Terms
0	constant	5	monomial
1	linear	$3x - 4$	binomial
2	quadratic	$x^2 + 3x + 2$	trinomial
3	cubic	$3x^3 + 7$	binomial
4	quartic	$5x^4 - 2x^3 + 7x$	trinomial
5	quintic	$7x^5$	monomial

Problem 1 : Add or subtract

$$a. \quad 2x^2 + 7x^2 = 9x^2 \quad \begin{array}{l} 2x + 7x = 9x \\ (2+7)x \end{array}$$

$$b. \quad 8x^2y - 3x^2y = 5x^2y$$

$$c. \quad (\underline{5x^2} - \underline{3x} + 7) + (\underline{9x^3} + \underline{2x^2} - 4)$$

$$9x^3 + 7x^2 - 3x + 3$$

$$d. \quad (\underline{3x^3} - \underline{4x} + \underline{7x^2}) + (\underline{8x^2} - \underline{6x} - 5)$$

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

$$e. \quad (2x^3 + 4x^2 - 3x) - (6x^3 + 5x^2 - 4)$$

$$\underline{2x^3} + \underline{4x^2} - \underline{3x} - \underline{6x^3} - \underline{5x^2} + 4$$

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

$$f. \quad (-9r^3 + 2r - 1) - (-5r^2 + r + 8)$$

$$\boxed{-9r^3} + \boxed{2r} - 1 + \boxed{5r^2} - \boxed{r} - 8$$

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

Sec. 8.2 Multiplying and Factoring

Problem 1: Simplify

$$a. \quad x^2(3x^3 - 2x^2 + 8)$$

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

Multiply:
ADD exp.

$$b. \quad 4x(2x^3 - 7x^2 + x)$$

$$8x^4 - 28x^3 + 4x^2$$

Problem 2: Factor (GCF)

$$a. \quad \frac{6x^3}{6x^1} + \frac{12x^2}{6x^1} + \frac{18x^1}{6x^1}$$

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

$$b. \quad \frac{14m^3}{7} - \frac{35m^2}{7} + \frac{28}{7}$$

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

$$c. \quad \frac{6x^3}{3x} - \frac{15x^2}{3x} + \frac{12x}{3x}$$

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

Sec. 8.3 Multiplying Binomials

Simplify:

$$\begin{aligned}
 \text{a. } & (x+4)(2x-1) \\
 &= x(2x-1) + 4(2x-1) \\
 &= 2x^2 - \underline{x} + \underline{8x} - 4 \\
 &= 2x^2 + 7x - 4
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } & (3x+1)(4x-2) \\
 & 3x(4x-2) + 1(4x-2) \\
 & 12x^2 - 6x + 4x - 2 \\
 & 12x^2 - 2x - 2
 \end{aligned}$$

$$\text{c. } (2x^2 - 5x + 4)(x+3)$$

$$\begin{aligned}
 & 2x^2(x+3) - 5x(x+3) + 4(x+3) \\
 & 2x^3 + 6x^2 - 5x^2 - 15x + 4x + 12 \\
 & 2x^3 + x^2 - 11x + 12
 \end{aligned}$$

OR

$$\begin{aligned}
 & x(2x^2 - 5x + 4) + 3(2x^2 - 5x + 4) \\
 & 2x^3 - 5x^2 + 4x + 6x^2 - 15x + 12 \\
 & 2x^3 + x^2 - 11x + 12
 \end{aligned}$$