

Chapter Review



Adding and Subtracting Polynomials

- Add like terms
- Write answer in standard form
- Be careful when subtracting

Example

$$\begin{array}{r} 2x^2 + 3x + 1 \\ + x^3 + 6x^2 - 5 \\ \hline \end{array}$$

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

$$\text{Answer in standard form} = x^3 + 8x^2 + 3x - 4$$

Example

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

First distribute
negative sign to

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

Add like terms = $4x^2 + 5x + 2$
write in standard
form



Multiplying Polynomials

Methods

1. F.O.I.L. (Binomials Only)
2. Distribute
3. Special Rules

F.O.I.L. (First, Outer, Inner, Last)

Example $(2x+1)(x+5)$

$$\begin{array}{l}
 \begin{array}{c}
 \text{F} \quad \text{O} \\
 \curvearrowright \quad \curvearrowright \\
 (2x+1)(x+5) \\
 \curvearrowleft \quad \curvearrowleft \\
 \text{I} \quad \text{L}
 \end{array}
 \\
 (2x+1)(x+5) = 2x(x) + 2x(5) + 1(x) + 1(5) \\
 = 2x^2 + 10x + 1x + 5 \\
 \text{Answer} = 2x^2 + 11x + 5
 \end{array}$$

Distribute Method

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

$$\begin{array}{l}
 (x-5)(3x^2+2x-4) = 3x^3 + 2x^2 - 4x \\
 (x-5)(3x^2+2x-4) = -15x^2 - 10x + 20
 \end{array}
 \left. \vphantom{\begin{array}{l} (x-5)(3x^2+2x-4) = 3x^3 + 2x^2 - 4x \\ (x-5)(3x^2+2x-4) = -15x^2 - 10x + 20 \end{array}} \right\} \begin{array}{l} \text{add} \\ \text{like} \\ \text{terms} \end{array}$$

$$\text{Answer} = 3x^3 - 13x^2 - 14x + 20$$



Special Polynomial Multiplication Rules

• 3 cases

Case 1 $(a+b)(a-b) = a^2 - b^2$

Example $(2x+3)(2x-3) = (2x)^2 - (3)^2$
answer = $4x^2 - 9$

Case 2 $(a+b)^2 = a^2 + 2ab + b^2$

Example $(x+7)^2 = (x)^2 + 2(x)(7) + (7)^2$
answer = $x^2 + 14x + 49$

Case 3 $(a-b)^2 = a^2 - 2ab + b^2$

Example $(3x-2)^2 = (3x)^2 - 2(3x)(2) + (2)^2$
answer = $9x^2 - 12x + 4$



Factoring the Greatest Common Factor

- Always first step in factoring
- Reverse of distributive property

Example, Factor the gcf

	\downarrow		<u>gcf</u>
$4x + 10$	→	$2(2x + 5)$	2
$6x^2 + 3x$	→	$3x(2x + 1)$	3x
$x^3y^2 - xy$	→	$xy(x^2y - 1)$	xy

NOTE: need to know properties of exponents



Factoring Quadratic Trinomials

2 cases

Case 1 - leading term is $1x^2$

Example $x^2 - 4x - 5$

Factors $(x - 5)(x + 1)$

plug in -5 and 1

$x^2 - 4x - 5$

↑ look for factors of -5 that add up to -4

In this case the factors are -5 and 1

Case 2 - leading term is not $1x^2$ $(2x+1)(x-4)$

Example $2x^2 - 7x - 4$

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

Factors *

Factors

Factors must add up to middle term

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

$-8x$

$1x + -8x = -7x$
middle term

$2x^2 - 7x - 4$



Special Factoring Rules

Use the special product rules to find factors

• 3 cases

Case 1 $(a+b)(a-b) = a^2 - b^2$

$$(2x+3)(2x-3) = (2x)^2 - (3)^2 \\ = 4x^2 - 9$$

Example factor $4x^2 - 9$

$$\text{factors} = (2x+3)(2x-3)$$

Case 2 $(a+b)^2 = a^2 + 2ab + b^2$

Example factor $x^2 + 14x + 49$

$$(x+7)^2 = (x)^2 + 2(x)(7) + (7)^2 = x^2 + 14x + 49$$

↑

factors

Case 3 $(a-b)^2 = a^2 - 2ab + b^2$

Example factor $9x^2 - 12x + 4$

$$(3x-2)^2 = (3x)^2 - 2(3x)(2) + (2)^2 = 9x^2 - 12x + 4$$

↑

factors