

Objective: To multiply polynomials

Method 1: Distribution (monomial  $\times$  polynomial)

- distribute the term outside of parenthesis to every term inside parenthesis by multiplication.

example:  $2x^3(x^3 + 3x^2 - 2x + 5)$

$$2x^6 + 6x^5 - 4x^4 + 10x^3$$

Method 2: FOIL (binomial  $\times$  binomial)

First Outside Inside Last

- 1.) Multiply the first terms of each binomial
- 2.) Multiply the two outer most terms
- 3.) Multiply the two inner most terms
- 4.) Multiply the two last terms
- 5.) Combine like terms

example:

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

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

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

## Method 3 : Box Method

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

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

$$\boxed{2x^2 + 7x - 15}$$

a.) draw a table of products from the terms.

b.) multiply into each box.

c.) combine like terms

2.)  $(3b-4)(b^2+6b-7)$

	$b^2$	$6b$	$-7$
$3b$	$3b^3$	$18b^2$	$-21b$
$-4$	$-4b^2$	$-24b$	$28$

$$\boxed{3b^3 + 14b^2 - 45b + 28}$$

horizontal

## Method 4 : Method

$$(3b-4)(b^2+6b-7)$$

$$3b^3 + 18b^2 - 21b - 4b^2 - 24b + 28$$

$$\boxed{3b^3 + 14b^2 - 45b + 28}$$

1.) distribute 1st term to second polynomial

2.) distribute the next term to second polynomial

3.) combine like terms.

## Method 5: vertical Method

$$(3b-4)(b^2+6b-7)$$

$$\begin{array}{r} b^2 + 6b - 7 \\ * \quad 3b - 4 \\ \hline 3b^3 - 4b^2 - 24b + 28 \\ 3b^3 + 18b^2 - 21b \quad 0 \\ \hline 3b^3 + 14b^2 - 45b + 28 \end{array}$$

1.) line up terms with longer polynomial on top.

2.) Multiply vertically

3.) combine like terms