

Multiplying Polynomials

Method 1 Distribution: a monomial and a polynomial

$$a(b+c) = ab + ac$$

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

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

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

Example: $4y(-y^3 - 2y - 1)$

$$4y(-y^3) - (4y)(2y) - (4y)(1)$$

$$-4y^4 - 8y^2 - 4y$$

You try!

$$-5b^3(4b^5 - 2b^3 + b - 11)$$

$$-20b^8 + 10b^6 - 5b^4 + 55b^3$$

~~NeAAAA~~

Method 2

Box

2 x 2

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

		$3x$	$+ 2$
x	$3x(x)$	$2(x)$	
	$3x^2$	$2x$	
-4	$3x(-4)$	$2(-4)$	
	$-12x$	-8	

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

$3x^2 - 10x - 8$

2 x 2

You Try! $(2x + 1)(x - 4)$

~~XXXX~~

		x	-4
$2x$	$(2x)(x)$	$-8x$	
	$2x^2$	$-8x$	
1	$1x$	-4	

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

$2x^2 - 7x - 4$

Method 3

FOIL

* only works when multiplying two binomials *

First

Outside

Inside

Last

Example:

$$(2x + 3)(4x + 1)$$

$$\frac{\text{First}}{2x(4x)}$$

$$\frac{\text{Outside}}{2x(1)}$$

$$\frac{\text{Inside}}{3(4x)}$$

$$\frac{\text{Last}}{3(1)}$$

$$8x^2 + \underline{2x} + \underline{12x} + 3$$

$$\boxed{8x^2 + 14x + 3}$$

Practice

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

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

3) $(8p - 3)(2p - 5)$

4) $(w + 1)(w^2 + 2w + 1)$