How can we multiply Polynomials?

1. Distributive Property - Any Polynomials
2. FOIL - Only for Binomials

Using the Distributive Property to multiply Polynomials

Ex 1: $4x(3x+3)$

$4x(3x) + 4x(3)$

$\boxed{12x^2 + 12x}$

Ex 2: $(x+1)(2x-1)$

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

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

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

$\boxed{2x^2 + x + (-1)}$

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

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

$x^3 + 2x^2 + 2x^2 + 4x + 6x + 12$

$\boxed{x^3 + 4x^2 + 10x + 12}$

Ex 4: $\left(2x^2 - 3x + 2\right)\left(-x^2 + 5x - 5\right)$

$\left(2x^2 - 3x + 2\right)\left(-x^2\right) + \left(2x^2 - 3x + 2\right)\left(5x\right) + \left(2x^2 - 3x + 2\right)\left(-5\right)$

$-2x^4 + \underline{3x^3} + \left(-2x^2\right) + \underline{10x^3} + \left(-15x^2\right) + \underline{10x} + \left(-10x^2\right) + \underline{15x} + (-10)$

$\boxed{-2x^4 + 13x^3 + \left(-27x^2\right) + 25x + (-10)}$

Using FOIL to multiply Binomials

To multiply two binomials, find the sum of the products of

F   the first terms,

O   the outer terms,

I   the inner terms,

L   the last terms.

Ex 1: $(x + 2)(x + 3)$

F   O   I   L

$x(x) + x(3) + 2(x) + 2(3)$

$x^2 + 3x + 2x + 6$

$\boxed{x^2 + 5x + 6}$

Ex 2: $(x+y)(2x-3y)$

F   O   I   L

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

$2x^2 + (-3xy) + 2xy + (-3y^2)$

$\boxed{2x^2 + (-xy) + (-3y^2)}$

Ex 3: $(m-3)(m+4)$

F   O   I   L

$m^2 + 4m + (-3m) + (-12)$

$\boxed{m^2 + m + (-12)}$

Ex 4: $(n+6)(n+1)$

$n^2 + n + 6n + 6$

$\boxed{n^2 + 7n + 6}$

Ex 5: $(2m+6)(m-1)$

$2m^2 + (-2m) + 6m + (-6)$

$\boxed{2m^2 + 4m + (-6)}$

Ex 6: $(5a-1)(5a+6)$

$25a^2 + 30a + (-5a) + (-6)$

$\boxed{25a^2 + 25a + (-6)}$

Ex 7: $(x-4)(x+4) - (x+3)(x-3)$

$(x^2 + 4x + (-4x) + (-16)) - (x^2 + (-3x) + 3x + (-9))$

$(x^2 + (-16)) - (x^2 + (-9))$

$x^2 + (-16) + (-x^2) + 9$

$\boxed{-7}$

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Ex 8: $(x-2)^3$

$(x-2)(x-2)(x-2)$

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

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

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

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

$$\boxed{x^3+(-6x^2)+12x+(-8)}$$

Assignment #51

Part I: p. 565-566 #1-2, 6-8, 17-35 odd, 46-48

Part II: p. 566 #18-24 even, 28-36 even
          p. 572 #3-17 odd, 11-15 odd, 23-33 odd