TOPIC: MULTIPLY POLYNOMIALS

FOIL Method

- Many problems involve multiplying two _____. Instead of distributing, use the **FOIL** method and simplify.
  - **FOIL** is an acronym that tells you which two terms to multiply and in what order!

F.O.I.L.

Multiply **F**_____ terms ⇒ **O**_____ terms ⇒ **I**_____ terms ⇒ **L**_____ terms

Distributive Property

$x^2(x-2)$

$x^3 - 2x^2$

F.O.I.L.

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

PRACTICE: Multiply the polynomials by using FOIL.

$(x-5)(x-12)$

PRACTICE: Multiply the polynomials by using FOIL.

$(4x+7)(-x+6)$

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PRACTICE: Multiply the polynomials by using FOIL.

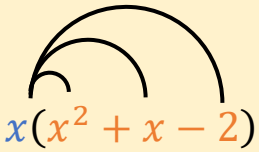
$$(x^2 - 3x)(2x + 8)$$

Distributive Property

- For multiplying polynomials with > 2 terms, _____ terms of shortest expression, then _____.

Summary of Multiplying Polynomials

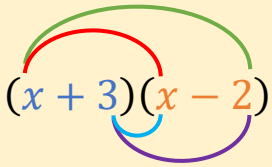
1 Term × Many Terms



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

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

2 Terms × 2 Terms
(FOIL)



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

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

$$x^2 + x - 6$$

Many Terms × Many Terms

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

PRACTICE: Multiply the polynomials.

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

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PRACTICE: Multiply the polynomials.

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

Special Products – Square Formulas

- For some polynomials, using formulas to multiply is easier and faster than FOIL-ing or distributing.

EXAMPLE: Multiply the polynomial.

$(x+5)(x-5)$

$a =$ ___ $b =$ ___

$(x+6)^2$

$a =$ ___ $b =$ ___

$(x+3)(x-3)$

$(a+b)(a-b) =$ _____

(Difference of Squares)

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

$(a-b)^2 = a^2$ ___ $2ab$ ___ b^2

(Square of Binomial / Perfect Square Trinomial)

PRACTICE: Multiply the polynomials using special product formulas.

$$(5x-9)(5x+9)$$

PRACTICE: Multiply the polynomials using special product formulas.

$$(3x+5)(3x+5)$$

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Special Products – Cube Formulas

EXAMPLE: Multiply the polynomial using formulas.

$(x-3)^3$

a = ___ b = ___

$(a+b)^3 = a^3 \_\_\_ 3a^2b \_\_\_ 3ab^2 \_\_\_ b^3$

$(a-b)^3 = a^3 \_\_\_ 3a^2b \_\_\_ 3ab^2 \_\_\_ b^3$

Coefficients: (*Cube of Binomial*)

Powers of a: [↑ | ↓]

Powers of b: [↑ | ↓]

PRACTICE: Multiply the polynomials using special product formulas.

$(2x+4)^3$