

TOPIC: MULTIPLYING POLYNOMIALS

Multiply Polynomials by Monomials

- ◆ To multiply polynomials by monomials (1 term) use the distributive property:

Recall

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

EXAMPLE

Use the distributive property to simplify each expression.

(A)

$$4x(3x - 7)$$

(B)

$$(y^2 + 3y + 2)5y^2$$

PRACTICE

Multiply each expression.

(A)

$$3a(5a + 3b)$$

(B)

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

(C)

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

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Multiply Binomials Using the 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 \Rightarrow **O** _____ terms \Rightarrow **I** _____ terms \Rightarrow **L** _____ terms

Distributive Property

F.O.I.L.

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

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

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

PRACTICE

Multiply the polynomials by using FOIL.

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

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

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

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EXAMPLE

Multiply the polynomials by using FOIL.

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

PRACTICE

Multiply the polynomials by using FOIL.

$$(5xy + 3)(4xy - 2)$$

EXAMPLE

For the pair of functions find $(fg)(x)$.

$$f(x) = 2x + 4, \quad g(x) = x - 3$$

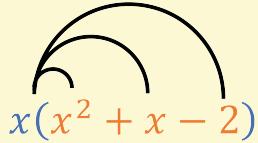
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Multiply Binomials Using the Distributive Property

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

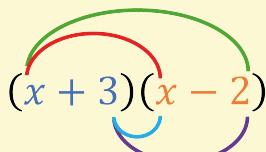
Summary of Multiplying Polynomials

1 Term \times Many Terms



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

2 Term \times 2 Terms (FOIL)



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

$$x^2 + x - 6$$

Many Terms \times Many Terms

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

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PRACTICE

Multiply the polynomials.

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

EXAMPLE

Multiply the polynomials.

$$2x(x + 3)(-5x + 7)$$

PRACTICE

Multiply the polynomials.

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

EXAMPLE

For the pair of functions find $(fg)(x)$.

$$f(x) = 2x + 5, \quad g(x) = x^2 + 4x - 9$$