

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

TOPIC: MULTIPLYING POLYNOMIALS

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

$$\begin{aligned}x^2(x - 2) \\ x^3 - 2x^2\end{aligned}$$

F.O.I.L.

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

PRACTICE

Multiply the polynomials by using FOIL.

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

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

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

TOPIC: MULTIPLYING POLYNOMIALS

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 $(fg)(x)$.

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

TOPIC: MULTIPLYING POLYNOMIALS

Multiply Binomials Using the 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 Term × 2 Terms
(FOIL)

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

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

$$x^2 + x - 6$$

Many Terms × Many Terms

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

TOPIC: MULTIPLYING POLYNOMIALS

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 $(fg)(x)$.

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