Math 10 Lecture Videos

Section 5.3: Special Products

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SPECIAL PRODUCTS

- In this section we will use the **distributive property** to develop patterns that will allow us to multiply some special binomials quickly.

- We will find the product of two binomials using a method called **FOIL**.

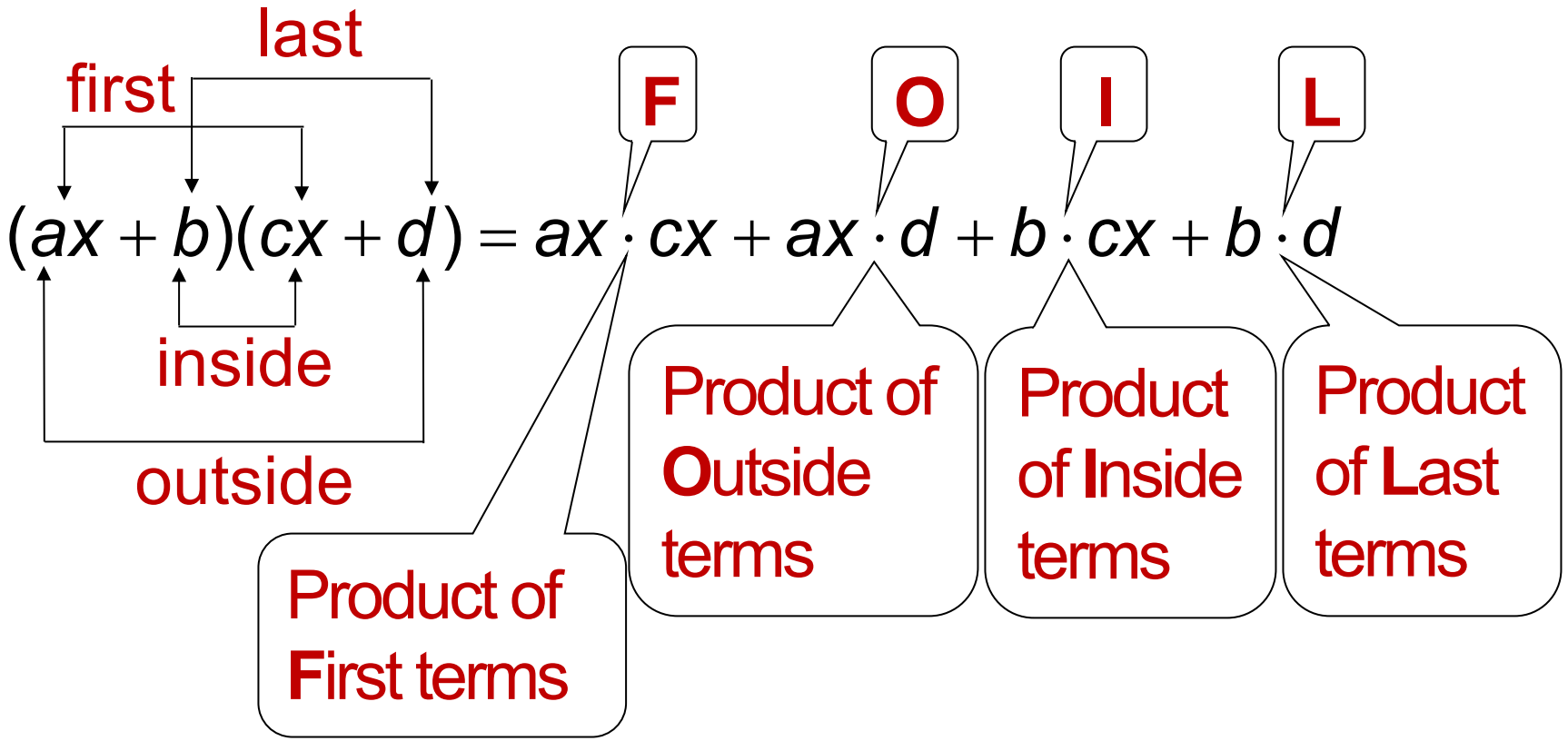
- We will learn a formula for finding the square of a binomial sum. We will also learn formula for finding the product of the sum and difference of two terms.

OBJECTIVES:

1. Use FOIL method to multiply binomials.
2. Multiply the sum and difference of two terms.
3. Find the square of a binomial sum.
4. Find the square of a binomial difference.

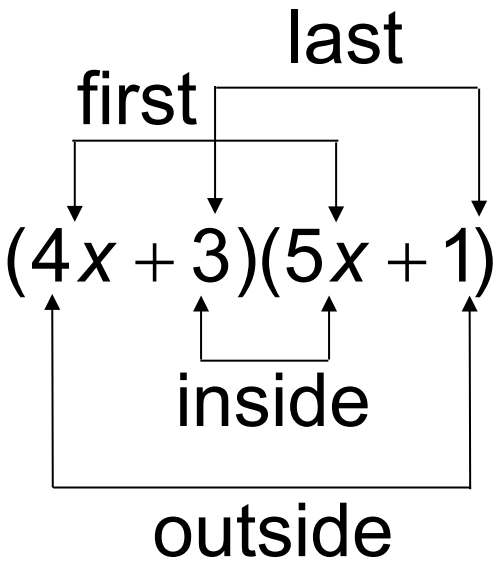
Objective 1: Use the FOIL method to multiply binomials

FOIL: First, Outside, Inside, Last



Objective 1: Use the FOIL method to multiply binomials

Example 1: Multiply $(4x+3)(5x+1)$.



F O I L

$$(4x+3)(5x+1) = 4x\cdot 5x + 4x\cdot 1 + 3\cdot 5x + 3\cdot 1$$

$$= 20x^2 + 4x + 15x + 3$$

$$= 20x^2 + 19x + 3$$

Objective 1: Use the FOIL method to multiply binomials

Example 2: Multiply $(5x+2)(x+7)$

$$(5x+2)(x+7) = 5x \cdot x + 5x \cdot 7 + 2 \cdot x + 2 \cdot 7$$

$$= 5x^2 + 35x + 2x + 14$$

$$= 5x^2 + 37x + 14$$

Objective 1: Use the FOIL method to multiply binomials

Example 3: Multiply $(x+5)(x+6)$

$$(x+5)(x+6) = x \cdot x + 6 \cdot x + 5 \cdot x + 5 \cdot 6$$

$$= x^2 + 6x + 5x + 30$$

$$= x^2 + 11x + 30$$

Objective 2: Multiply the sum and difference of two terms.

$$(A+B)(A-B)=A^2-B^2$$

The **product of the sum and the difference of the same two terms** is the **square of the first term minus** the **square of the second term.**

Example 1: Multiply (7y + 8) (7y – 8)

Let A = 7y (first term)
Let B = 8 (second term)

$= A^2 - B^2$
$= (7y)^2 - 8^2$
$= 7^2y^2 - 64$
$\mathbf{= 49y^2 - 64}$

Objective 2: Multiply the sum and difference of two terms.

$$(A+B)(A-B)=A^2-B^2$$

Example 2: Multiply $(2a^3 + 3)(2a^3 - 3)$

Let $A = 2a^3$ (first term)
Let $B = 3$ (second term)

$= A^2 - B^2$
$= (2a^3)^2 - 3^2 = 2^2a^{3(2)} - 9$
$\mathbf{= 4a^6 - 9}$

Objective 3: Find a square of a binomial sum.

$$(A+B)^2 = A^2 + 2AB + B^2$$

The **square of a binomial sum** is the **first term squared plus two times the product of the terms plus** the **last term squared.**

Objective 3: Find a square of a binomial sum.

$$(A+B)^2 = A^2 + 2AB + B^2$$

Example: Multiply $(4x+y)^2$.

Let A = 4x
Let B = y

$A^2 = (4x)^2 = 4^2x^2 = = 16x^2$
$2AB = (2)(4x)(y) = 8xy$
$B^2 = y^2$

$(A+B)^2 = A^2 + 2AB + B^2$
$= 16x^2 + 8xy + y^2$

Objective 3: Find a square of a binomial sum.

$$(A+B)^2 = A^2 + 2AB + B^2$$

Example: Multiply $(5x+4)^2$

Let A = 5x
Let B = 4

$A^2 = (5x)^2 = 5^2x^2 = = 25x^2$
$2AB = (2)(5x)(4) = 40x$
$B^2 = 4^2 = 16$

$(A+B)^2 = A^2 + 2AB + B^2$
$= 25x^2 + 40x + 16$

Objective 4: Find the square of a binomial difference.

$$(A-B)^2 = A^2 - 2AB + B^2$$

The square of a binomial difference is the first term squared minus two times the product of the terms plus the last term squared.

Objective 4: Find the square of a binomial difference.

Example: Multiply $(3x-4y)^2$.

Let A = 3x
Let B = 4y

$A^2 = (3x)^2 = 3^2x^2 = = 9x^2$
$2AB = (2)(3x)(4y) = 24xy$
$B^2 = (4y)^2 = 4^2y^2 = = 16y^2$

$(A+B)^2 = A^2 - 2AB + B^2$
$= 9x^2 - 24xy + 16y^2$

Objective 4: Find the square of a binomial difference.

Example: Multiply $(x-9)^2$

Let A = x
Let B = 9

$A^2 = x^2$
$2AB = (2)(x)(9) = 18x$
$B^2 = 9^2 = 81$

$(A+B)^2 = A^2 - 2AB + B^2$
$\mathbf{= x^2 - 18x + 81}$

Objective 4: Find the square of a binomial difference.

Example: Multiply $(7x-3)^2$

Let A = 7x
Let B = 3

$A^2 = (7x)^2 = 7^2x^2 = 49x^2$
$2AB = (2)(7x)(3) = 42x$
$B^2 = 3^2 = 9$

$(A+B)^2 = A^2 - 2AB + B^2$
$= 49x^2 - 42x + 9$

OBJECTIVES:

1. Use FOIL method to multiply binomials. ✓
2. Multiply the sum and difference of two terms. ✓
3. Find the square of a binomial sum. ✓
4. Find the square of a binomial difference. ✓