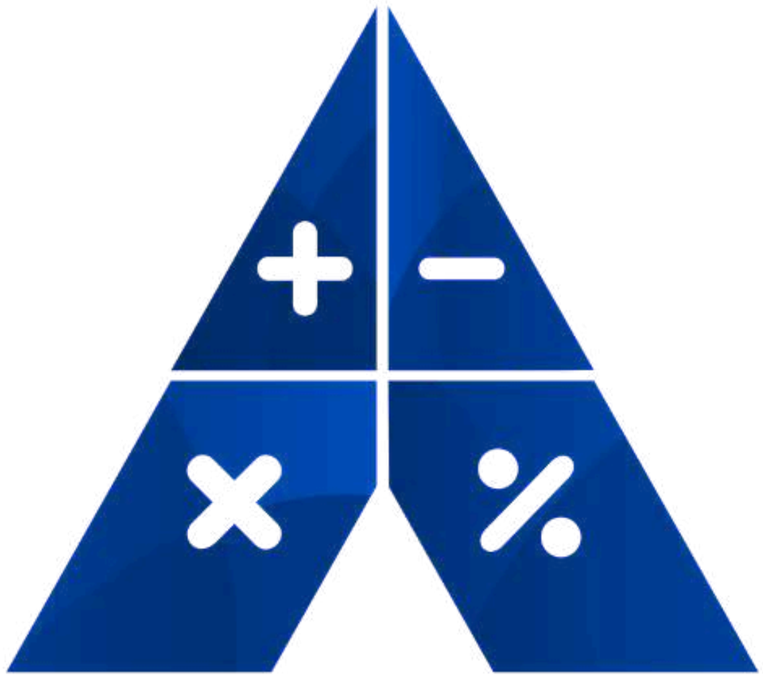


AlgePRO

Lesson 2

SQUARE OF A TRINOMIAL

MATH 8 - QUARTER 1

Square of a Trinomial

Before we dive into the methods, let's clarify what we mean by squaring a trinomial.

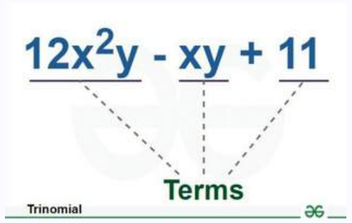
A **trinomial** is an algebraic expression with three terms, like

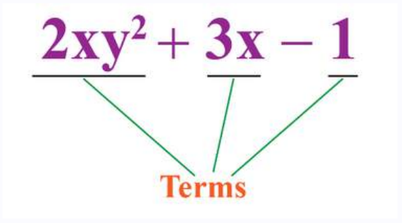
$$a + b + c.$$

where a, b and c are the first, second, and third terms, respectively.

Squaring a trinomial means multiplying it by itself:

$$(a + b + c)^2 = (a + b + c)(a + b + c).$$





Square of a Trinomial: Methods

Method 1: Distributive Property

This method is like breaking down a big problem into smaller, more manageable ones.

1. Write the trinomial twice, side by side.

First Trinomial

$$(a + b + c)^2 \longrightarrow (a + b + c)(a + b + c)$$

Second Trinomial

2. Distribute the terms: Multiply each term in the second trinomial by the first (a), second (b), and third (c) terms of the first trinomial.

$$a(a + b + c) + b(a + b + c) + c(a + b + c)$$

$$a(a + b + c) + b(a + b + c) + c(a + b + c)$$

It will form, $a^2 + ab + ac + ab + b^2 + bc + ac + bc + c^2$

3. Then, combine like terms. Then, we now have,

$$a^2 + 2ab + 2ac + b^2 + 2bc + c^2$$

Square of a Trinomial: Methods

Method 2: Binomial Expansion

This method uses a pattern that occurs when you square a binomial and is denoted by:

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$$

Example: $(x + y + z)^2$

1. Write the value of each term: a, b, and c.

$$a = x,\ b = y,\ c = z$$

2. Square each term. Find a^2 , b^2 , and c^2 .

$$(a)^2 = (x)^2 = x^2 \qquad (b)^2 = (y)^2 = y^2 \qquad (c)^2 = (z)^2 = z^2$$

3. Compute the products of pairs of terms. Find 2ab, 2ac, and 2bc.

$$2ab = 2(x)(y) = 2xy \qquad 2ac = 2(x)(z) = 2xz \qquad 2bc = 2(y)(z) = 2yz$$

4. Combine all terms from step 1 and step 2. Then, we now have,

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2xz + 2yz$$

Worked Examples

Using **Distributive Method**

Direction: Square and simplify the given trinomial.

Example I. $(2x + y + 4)^2$

1. Write the trinomial twice, side by side.

First Trinomial

$$(2x + y + 4)^2 \longrightarrow (2x + y + 4)(2x + y + 4)$$

Second Trinomial

2. Distribute the terms: Multiply each term in the second trinomial by the first (2x), second (y), and third (4) terms of the first trinomial.

$$2x(2x + y + 4) + y(2x + y + 4) + 4(2x + y + 4)$$

$$2x(2x + y + 4) + y(2x + y + 4) + 4(2x + y + 4)$$

It will form, $4x^2 + 2xy + 8x + 2xy + y^2 + 4y + 8x + 4y + 16$

3. Then, combine like terms. Then, we now have,

$$4x^2 + 16x + 4xy + y^2 + 8y + 16$$

Worked Examples

Using **Binomial Expansion Method**

Direction: Square and simplify the given trinomial.

Example I. $(2x + y + 4)^2$

1. Write the value of each term: a, b, and c.

$a = 2x,\ b = y,\ c = 4$

2. Square each term. Find a2, b2, and c2.

$(a)^2 = (2x)^2 = 4x^2$ $(b)^2 = (y)^2 = y^2$ $(c)^2 = (4)^2 = 16$

3. Compute the products of pairs of terms. Find 2ab, 2ac, and 2bc.

$2ab = 2(2x)(y) = 4xy$ $2ac = 2(2x)(4) = 16x$ $2bc = 2(y)(4) = 8y$

4. Combine all terms from step 1 and step 2. Then, we now have,

$(2x + y + 4)^2 = 4x^2 + 16x + 4xy + y^2 + 8y + 16$