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Binomial Theorem for Expansion - Guided Lesson Explanation

For all problems remember that:

Binomial expressions contain two terms.

The first terms is seen as a^n and the last term is seen as b^n.

The following expansion formulas can be used to expand binomials based on their exponential form.

$(a + b)^0 = 1$

$(a + b)^1 = a + b$

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

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

$(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

Explanation#1

The binomial that we are presented with is to the third power. That indicates that we should us the following formula:

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

We will insert our values for a and b into the formula: $(4x + y)^3$

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

$64x^3 + 48x^2y + 12xy^2 + y^3$

Explanation#2

The binomial that we are presented with is to the second power. That indicates that we should us the following formula:

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

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We will insert our values for a and b into the formula: $(2x + 4y)^2$

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

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

Let's divide everything by 4 to get it into its simplest form.

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

Explanation#3

Without using the binomial theorem, we know that anything to the first power is itself. Let's run it through the theorem to see what we end up with.

The binomial that we are presented with is to the first power. That indicates that we should us the following formula:

$(a + b)^1 = a + b$

We will insert our values for a and b into the formula: $(5x + 2y)^1$

$5x + 2y$