

Cube Of Binomials

The background is a solid green color. It is decorated with various mathematical symbols in a lighter shade of green. These symbols include plus signs (+), minus signs (-), multiplication signs (x), division signs (/), and squares. Some of the symbols are rotated at different angles, creating a dynamic and abstract pattern around the central text.

Let's exercise our mind.

Solve the following.

1. $7^3 = 343$

2. $(4a)^3 = 64a^3$

3. $-9^3 = -729$

4. $(5a)^2(6b) = 150a^2b$

5. $(-8a)^2(-3) = -192a^2$

6. $(2x + 1)^2 = 4x^2 + 4x + 1$

7. $(x - 3y)(x^2 - 6xy + 9y^2)$
 $= x^3 - 9x^2y + 27xy^2 - 27y^3$

$$(x - 3y)^3 = (x - 3y)(x - 3y)(x - 3y)$$

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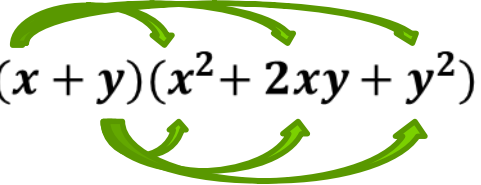
CUBE OF BINOMIALS

$$(3a + 9b)^3 = (3a + 9b)(3a + 9b)(3a + 9b) = (3a + 9b)(3a + 9b)^2$$

$$(4c - 7)^3 = (4c - 7)(4c - 7)(4c - 7) = (4c - 7)^2 (4c - 7)$$

Multiply Using the Distributive Property of Multiplication

$$(x + y)^3 = (x + y)(x + y)^2 = (x + y)(x^2 + 2xy + y^2)$$

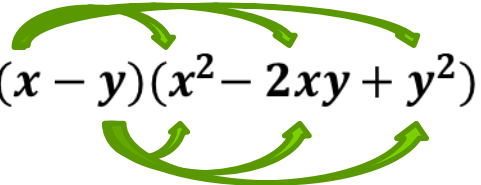


$$\begin{array}{r}
 (x + y)(x^2 + 2xy + y^2) \\
 \quad \quad \quad x^3 + 2x^2y + xy \\
 \quad \quad \quad + \quad x^2y + 2xy + y^3 \\
 \hline
 \underline{(x + y)^3 = x^3 + 3x^2y + 3xy + y^3}
 \end{array}$$

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Multiply Using the Distributive Property of Multiplication

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


$$\begin{array}{r} (x - y)(x^2 - 2xy + y^2) \\ + \quad \begin{array}{r} x^3 - 2x^2y + xy \\ -x^2y + 2xy - y^3 \end{array} \\ \hline \underline{(x - y)^3 = x^3 - 3x^2y + 3xy - y^3} \end{array}$$

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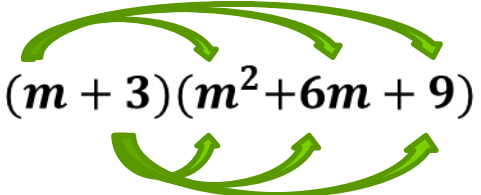
Examples:

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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

$$1. (m + 3)^3 = (m)^3 + 3(m)^2(3) + 3(m)(3)^2 + (3)^3$$

$$\underline{m^3 + 9m^2 + 27m + 27}$$



$$(m + 3)(m^2 + 6m + 9)$$

$$+ \underline{m^3 + 6m^2 + 9m}$$

$$\underline{(m + 3)^3 = m^3 + 9m^2 + 27m + 27}$$

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Examples:

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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

$$2. (5b - 6c)^3 = (5b)^3 + 3(5b)^2(-6c) + 3(5b)(-6c)^2 + (-6c)^3$$

$$(5b)^3 - 3(5b)^2(6c) + 3(5b)(6c)^2 - (6c)^3$$

$$\underline{125b^3 - 450b^2c + 540bc^2 - 216c^3} \quad \checkmark$$

$$(5b - 6c)(25b^2 - 60bc + 36c^2)$$

+

$$\begin{array}{r} 125b^3 - 300b^2c + 180bc^2 \\ -150b^2c + 360bc^2 - 216c^3 \\ \hline \end{array}$$

$$(5b - 6c)^3 = \underline{125b^3 - 450b^2c + 540bc^2 - 216c^3} \quad \checkmark$$

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Examples:

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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

$$3. (6r + 2t)^3 = (6r)^3 + 3(6r)^2(2t) + 3(6r)(2t)^2 + (2t)^3$$
$$\underline{216r^3 + 216r^2t + 72rt^2 + 8t^3}$$

$$4. (4j - 1)^3 = (4j)^3 - 3(4j)^2(1) + 3(4j)(1)^2 - (1)^3$$
$$\underline{64j^3 - 48j^2 + 12j - 1}$$

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Examples:

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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

$$5. (3a + 9b)^3 = (3a)^3 + 3(3a)^2(9b) + 3(3a)(9b)^2 + (9b)^3$$
$$\underline{27a^3 + 243a^2b + 729ab^2 + 729b^3}$$

$$6. (4c - 7)^3 = (4c)^3 - 3(4c)^2(7) + 3(4c)(7)^2 - (7)^3$$
$$\underline{64c^3 - 336c^2 + 588c - 343}$$

Remember:

- The cube of binomial is denoted by

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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

where x and y are the first and second terms, respectively.