Cube Of Binomials

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

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

CUBE OF BINOMIALS

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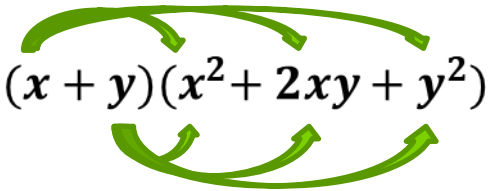
$(3a+9b)^3 = (3a+9b)(3a+9b)(3a+9b) = (3a+9b)(3a+9b)^2$

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

Multiply Using the Distributive Property of Multiplication

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

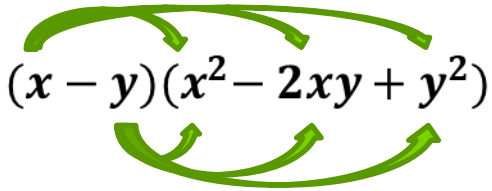


$$x^3+2x^2y+xy$$
$$+\quad x^2y+2x\quad +y^3$$
$$(x+y)^3 = x^3+3x^2y+3x\quad +y^3$$

CUBE OF BINOMIALS

Multiply Using the Distributive Property of Multiplication

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



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

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

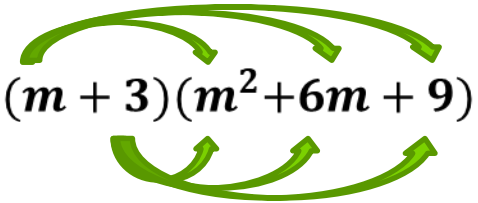
CUBE OF BINOMIALS

Examples:

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

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

$$m^3 + 9m^2 + 27m + 27$$



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

$$m^3 + 6m^2 + 9n$$
$$+ \quad 3m^2 + 18m + 27$$

$$(m+3)^3 = m^3 + 9m^2 + 27m + 27$$

CUBE OF BINOMIALS

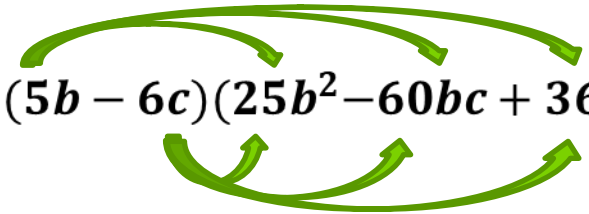
Examples:

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

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

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

$$125 - 450b^2c + 540bc^2 - 216c^3$$ ✓



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

$$125 - 300b^2c + 180bc^2$$
$$+ \quad -150b^2c + 360bc^2 - 216c^3$$
$$(5b-6c)^3 = 125 - 450b^2c + 540bc^2 - 216c^3$$ ✓

CUBE OF BINOMIALS

Examples:

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

3. $(6r+2t)^3 = (6r) + 3(6r)^2(+ 3(6r)(2t) + (2t)^3$

$216 + 216r^2t + 72rt^2 + 8t^3$

4. $(4j-1)^3 = (4j)^ - 3(4j)^2(1) + 3(4j)(1)^2 - (1)^3$

$64j^3 - 48j^2 + 12j - 1$

CUBE OF BINOMIALS

Examples:

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

5. $(3a+9b)^3 = (3a) + 3(3a)^2(9b) + 3(3a)(9b)^2 + (9b)^3$

$$27a^3 + 243a^2b + 729ab^2 + 729b^3$$

6. $(4c-7)^3 = (4c) - 3(4c)^2(7) + 3(4c)(7)^2 - (7)^3$

$$64c^3 - 336c^2 + 588c - 343$$

Remember:

- The cube of binomial is denoted by

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

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