Special Case on the Product of Binomial and Trinomial

Let's exercise our mind.

Solve the following

1. $(4x+5y)^3 = (4x) + 3(4x)^2(\quad + 3(4x)(5y \quad + (5y)^3$

$64x^3 + 240x^2y + 300xy^2 + 125y$

2. $(3x-7y)^3 = (3x) - 3(3x)^2(7y) + 3(3x)(7y)^2 - (7y)^3$

$27x^3 - 189x^2y + 441xy^2 - 343y^3$

SPECIAL CASE ON THE PRODUCT OF BINOMIAL AND TRINOMIAL

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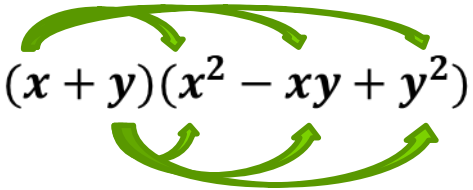
$(3x+1)(9x^2-3x+1)$ $(5p+7)(25p^2-35p+49)$

$(6a-b)(36a^2+6ab+b^2)$ $(7v-2)(49v^2+14v+4)$

Multiply Using the Distributive Property of Multiplication

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



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

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

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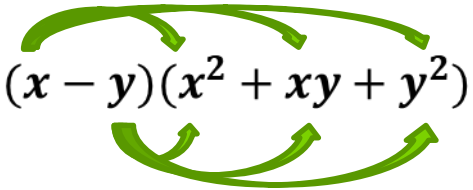
$(6a-b)(36a+6ab+b^2)$ $(7v-2)(49v^2+14v+4)$

Multiply Using the Distributive Property of Multiplication

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



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

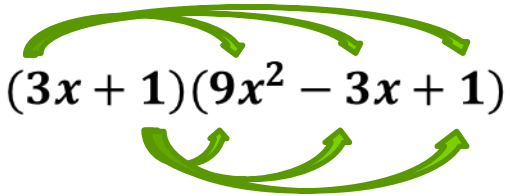
$$(x-y)(x^2+xy+y^2)=x^3-y^3$$

SPECIAL CASE ON THE PRODUCT OF BINOMIAL AND TRINOMIAL

Examples:

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

1. $(3x+1)(9x^2-3x+1) = (3x)^3+(1)^3$
   $x \quad y$
   $= 27x^3+1$ ✓



$$27x^3 - 9x^2 + 3x$$
$$+ \quad 9x^2 - 3x + 1$$

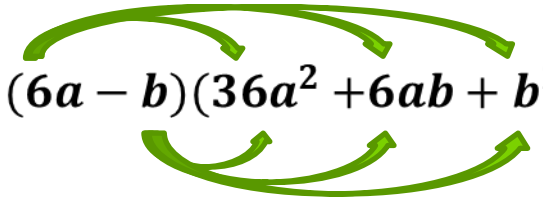
$$(3x+1)(9x^2-3x+1) = 27x^3+1$$ ✓

SPECIAL CASE ON THE PRODUCT OF BINOMIAL AND TRINOMIAL

Examples:

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

2. $(6a-b)(36a^2+6ab+b^2) = (6a)^3-(b)^3 \quad (6a)^3+(-b)^3$
   $x \quad y$
   $= 216a^3 - b^3$ ✓



$(6a-b)(36a^2+6ab+b^2) \quad 216a^3 + 36a^2b + 6ab^2$
$+ \quad -36a^2b - 6ab^2 - b^3$

$(6a-b)(36a^2+6ab+b^2) = 216a^3 - b^3$ ✓

SPECIAL CASE ON THE PRODUCT OF BINOMIAL AND TRINOMIAL

Examples:

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

3. $(5p+7)(25p^2-35p+49)=(5p)^3+(7)^3$

$$=125p^3+343$$

4. $(7v-2)(49v^2+14v+4)=(7v)^3-(2)^3$

$$=343v^3-8$$

5. $(10c-3d)(100c^2+30cd+9d^2)=(10c)^3-(3d)^3$

$$=1000c^3-27d^3$$

Remember:

When the sum of two terms is multiplied by the sum of their squares minus the product of these terms, the result is the sum of their cubes.

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

When the difference of two terms is multiplied by the sum of their squares plus the product of these terms, the result is the difference of their cubes.

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

Activity #5

Find the product of the following: (Show your solution and use the formula.)

A. Cube of Binomials (5pts)

1. $(3x - 4y)^3$

B. Special case on the product of binomial and trinomial (15pts)

1. $(m - 1)(m^2 + m + 1)$
2. $(3n + 7)(9n^2 - 21n + 49)$
3. $(2c + 5)(4c^2 - 10c + 25)$
4. $(6a - 8)(36a^2 + 48a + 64)$
5. $(9f - 4g)(81f^2 + 46fg + 16g^2)$

THANK YOU!!!