

Développer à l'aide de la Double Distributivité

I. Formule de la double distributivité

Propriété : Soient a, b, c et d des nombres relatifs

$$(a + b)(c + d) = ac + ad + bc + bd$$

	c	d
a	ac	ad
b	bc	bd

Démonstration : On pose $K = (a + b)$

On a donc : $(a + b)(c + d) = K(c + d)$

En utilisant la simple distributivité : $K(c + d) = Kc + Kd$

En remplaçant K par $(a + b)$, on obtient : $c \times (a + b) + d \times (a + b)$

En utilisant 2 fois la simple distributivité, on obtient : $ca + cb + da + db$

Finalement : $(a + b)(c + d) = ac + ad + bc + bd$

II. Exemples

Développer et réduire les expressions suivantes :

$$A = (2x + 5)(3x + 4)$$

$$B = (5t + 7)(6t - 4)$$

$$C = (2y - 3)(y - 5)$$

$$D = (3t - 5)(2 - t) + (5t + 4)(-5 + 2t)$$

$$E = 5(x - 4) - (3x - 8)(2x - 5)$$

$$F = (-3a - 2)(5a - 7) - 5(a - 1)$$

$$A = (2x + 5)(3x + 4)$$

$$A = 2x \times 3x + 2x \times 4 + 5 \times 3x + 5 \times 4$$

$$A = 6x^2 + 8x + 15x + 20$$

$$A = 6x^2 + 23x + 20$$

	3x	4
2x	6x ²	8x
5	15x	20

$$B = (5t + 7)(6t - 4)$$

$$B = 5t \times 6t + 5t \times (-4) + 7 \times 6t + 7 \times (-4)$$

$$B = 30t^2 - 20t + 42t - 28$$

$$B = 30t^2 + 22t - 28$$

	6t	-4
5t	30t ²	-20t
7	42t	-28

$$C = (2y - 3)(y - 5)$$

$$C = 2y \times y + 2y \times (-5) + (-3) \times y + (-3) \times (-5)$$

$$C = 2y^2 - 10y - 3y + 15$$

$$C = 2y^2 - 13y + 15$$

	y	-5
2y	2y ²	-10y
-3	-3y	15

$$D = (3t - 5)(2 - t) + (5t + 4)(-5 + 2t)$$

$$D = [3t \times 2 + 3t \times (-t) + (-5) \times 2 + (-5) \times (-t)] + [5t \times (-5) + 5t \times 2t + 4 \times (-5) + 4 \times 2t]$$

$$D = [6t - 3t^2 - 10 + 5t] + [-25t + 10t^2 - 20 + 8t]$$

$$D = 6t - 3t^2 - 10 + 5t - 25t + 10t^2 - 20 + 8t$$

$$D = -3t^2 + 10t^2 + 6t + 5t - 25t + 8t - 10 - 20$$

$$D = 7t^2 - 6t - 30$$

$$E = 5(x - 4) - (3x - 8)(2x - 5)$$

$$E = [5 \times x + 5 \times (-4)] - [3x \times 2x + 3x \times (-5) + (-8) \times 2x + (-8) \times (-5)]$$

$$E = [5x - 20] - [6x^2 - 15x - 16x + 40]$$

$$E = 5x - 20 - 6x^2 + 15x + 16x - 40$$

$$E = -6x^2 + 5x + 15x + 16x - 20 - 40$$

$$E = -6x^2 + 36x - 60$$

$$F = (-3a - 2)(5a - 7) - 5(a - 1)$$

$$F = [-3a \times 5a + (-3a) \times (-7) + (-2) \times 5a + (-2) \times (-7)] + [-5 \times a + (-5) \times (-1)]$$

$$F = [-15a^2 + 21a - 10a + 14] + [-5a + 5]$$

$$F = -15a^2 + 21a - 10a + 14 - 5a + 5$$

$$F = -15a^2 + 21a - 10a - 5a + 14 + 5$$

$$F = -15a^2 + 6a + 19$$