

Fiche de cours	Mathématiques	Quatrième
Chapitre : Développement	Développement	

1. Réduction.

Réduire une expression, c'est assembler les éléments de même nature.

$$A(x) = 3 - 2x + y - 5 + 6x - 2y$$

On assemble les éléments de même nature en entourant l'élément et son signe.

$$\begin{aligned}
 A(x) &= \boxed{3} \boxed{-2x} \boxed{+y} \boxed{-5} \boxed{+6x} \boxed{-2y} \\
 A(x) &= \underbrace{y - 2y}_{-1y} \underbrace{-2x + 6x}_{+4x} \underbrace{+3 - 5}_{-2} \\
 \boxed{A(x) = -y + 4x - 2}
 \end{aligned}$$

$$B(x) = 5 - 7x + 3x^2 - 8 + 6x - 2x^2$$

On assemble les éléments de même nature en entourant l'élément et son signe.

$$\begin{aligned}
 B(x) &= \boxed{5} \boxed{-7x} \boxed{+3x^2} \boxed{-8} \boxed{+6x} \boxed{-2x^2} \\
 B(x) &= \underbrace{3x^2 - 2x^2}_{x^2} \underbrace{-7x + 6x}_{-1x} \underbrace{+5 - 8}_{-3} \\
 \boxed{B(x) = x^2 - x - 3}
 \end{aligned}$$

2. Multiplication de "monômes".

$$(ax^n) \times (bx^p) = (a \times b) \underbrace{x^n \times x^p}_{x^{n+p}} = (a \times b) x^{n+p}$$

Rappels

$1x = x$	$x^0 = 1$
$-1x = -x$	$x^1 = x$
$0x = 0$	$x \times x = x^2$
$-(-3x) = 3x$	$x \times x^2 = x^3$
$2x = 2 \times x$	$x^n \times x^p = x^{n+p}$

$$\boxed{a \times (bx) = (a \times b) x} \quad (n = 0 \text{ et } p = 1)$$

$$C(x) = -5 \times (3x) = \underbrace{(-5 \times 3)}_{-15} x$$

$$\boxed{C(x) = -15x}$$

$$\boxed{(ax) \times (bx) = (a \times b) \underbrace{x \times x}_{x^2} = (a \times b) x^2}$$

$$D(x) = (4x) \times (-2x) = \underbrace{(4 \times (-2))}_{-8} \underbrace{x \times x}_{x^2}$$

$$\boxed{D(x) = -8x^2}$$

$$\boxed{a \times (bx^2) = (a \times b) x^2} \quad (n = 0 \text{ et } p = 2)$$

$$E(x) = -2 \times (-3x^2) = \underbrace{(-2 \times (-3))}_{+6} x^2$$

$$\boxed{E(x) = 6x^2}$$

$$\boxed{(ax) \times (bx^2) = (a \times b) \underbrace{x \times x^2}_{x^3} = (a \times b) x^3}$$

$$F(x) = (4x) \times (-x^2) = \underbrace{(4 \times (-1))}_{-4} \underbrace{x \times x^2}_{x^3}$$

$$\boxed{F(x) = -4x^3}$$

3. Distributivité simple.



$$k \times (a + b) = k \times a + k \times b$$

$$\begin{aligned} G(x) &= -2 \times (3 - 5x) \\ G(x) &= \underbrace{(-2) \times 3}_{-6} + \underbrace{(-2) \times (-5x)}_{+10x} \\ \boxed{G(x) = 10x - 6} \end{aligned}$$

$$\begin{aligned} H(x) &= -2x \times (-3 + 4x) \\ H(x) &= \underbrace{(-2x) \times (-3)}_{+6x} + \underbrace{(-2x) \times 4x}_{-8x^2} \\ \boxed{H(x) = -8x^2 + 6x} \end{aligned}$$

Remarque : On rangera toujours les monômes dans l'ordre des puissance décroissantes, c'est à dire par exemple les x^2 en 1er, puis les x et les nombres en dernier.

$$\begin{aligned} I(x) &= -3 \times (2 - x) - (x - 5) \\ I(x) &= \underbrace{-6}_{(-3) \times 2} + \underbrace{+3x}_{(-3) \times (-x)} - x + 5 \end{aligned}$$

Puis on réduit

$$\begin{aligned} I(x) &= \boxed{-6} \boxed{+3x} \boxed{-x} \boxed{+5} \\ I(x) &= \underbrace{+3x - x}_{+2x} \underbrace{-6 + 5}_{-1} \\ \boxed{I(x) = 2x - 1} \end{aligned}$$

$$\begin{aligned} J(x) &= -3x \times (2 - x) - 5(x - 4) \\ J(x) &= \underbrace{-6x}_{(-3x) \times 2} + \underbrace{+3x^2}_{(-3x) \times (-x)} \underbrace{-5x}_{(-5) \times x} + \underbrace{+20}_{(-5) \times (-4)} \end{aligned}$$

Puis on réduit

$$\begin{aligned} J(x) &= \boxed{-6x} \boxed{+3x^2} \boxed{-5x} \boxed{+20} \\ J(x) &= 3x^2 \underbrace{-6x - 5x}_{-11x} + 20 \\ \boxed{J(x) = 3x^2 - 11x + 20} \end{aligned}$$

4. Distributivité double.



$$(k + p) \times (a + b) = k \times a + k \times b + p \times a + p \times b$$

$$\begin{aligned} K(x) &= (4x + 2)(5 - 3x) \\ K(x) &= \underbrace{20x}_{4x \times 5} \underbrace{-12x^2}_{4x \times (-3x)} \underbrace{+10}_{2 \times 5} \underbrace{-6x}_{2 \times (-3x)} \\ K(x) &= -12x^2 \underbrace{+14x}_{20x - 6x} + 10 \\ \boxed{K(x) = -12x^2 + 14x + 10} \end{aligned}$$

$$\begin{aligned} L(x) &= (-5x + 1)(1 + 5x) \\ L(x) &= \underbrace{-5x}_{-5x \times 1} \underbrace{-25x^2}_{-5x \times 5x} \underbrace{+1}_{1 \times 1} \underbrace{+5x}_{1 \times 5x} \\ L(x) &= -25x^2 \underbrace{+0x}_{-5x + 5x} + 1 \\ \boxed{L(x) = -25x^2 + 1} \end{aligned}$$

$$M(x) = (4x + 2)(5 - 3x) - 2(-5x + 1)(1 + 5x)$$

$$\begin{aligned} M(x) &= \underbrace{20x}_{4x \times 5} \underbrace{-12x^2}_{4x \times (-3x)} \underbrace{+10}_{2 \times 5} \underbrace{-6x}_{2 \times (-3x)} \\ M(x) &= -12x^2 + 14x + 10 \end{aligned}$$

$$\begin{aligned} M(x) &= \underbrace{38x^2}_{-12x^2 + 50x^2} \underbrace{+14x}_{14x + 10x - 10x} \underbrace{+8}_{10 - 2} \\ \boxed{M(x) = 38x^2 + 18x + 8} \end{aligned}$$

$$\begin{aligned} & \boxed{-2} \times \left(\underbrace{-5x}_{-5x \times 1} \underbrace{-25x^2}_{-5x \times 5x} \underbrace{+1}_{1 \times 1} \underbrace{+5x}_{1 \times 5x} \right) \\ & + \underbrace{10x}_{\boxed{-2} \times (-5x)} \underbrace{+50x^2}_{\boxed{-2} \times (-25x^2)} \underbrace{-2}_{\boxed{-2} \times 1} \underbrace{-10x}_{\boxed{-2} \times 5x} \end{aligned}$$