Fiche de cours	Mathématiques	Quatrième
Chapitre : Développement	Développement	

1. Réduction.

$\boxed{\textbf{Réduire une expression}\text{, c'est assembler les éléments de même nature.}}$

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

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

$$A(x) = \boxed{3}\,\boxed{-2x}\,\boxed{+y}\,\boxed{-5}\,\boxed{+6x}\,\boxed{-2y}$$

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

$$\boxed{A(x) = -y + 4x - 2}$$

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

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

$$B(x) = \boxed{5}\,\boxed{-7x}\,\boxed{+3x^2}\,\boxed{-8}\,\boxed{+6x}\,\boxed{-2x^2}$$

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

$$\boxed{B(x) = x^2 - x - 3}$$

2. Multiplication de "monômes".

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

Rappels

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

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

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

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

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

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

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

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

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

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

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

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

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

3. Distributivité simple.

$$\boxed{{\color{red}k} \times (a + b) = {\color{red}k} \times a + {\color{red}k} \times b}$$

$$G(x) = {\color{red}-2} \times (3 - 5x)$$
$$G(x) = \underbrace{{\color{red}(-2)} \times 3}_{-6} + \underbrace{{\color{red}(-2)} \times (-5x)}_{+10x}$$
$$\boxed{G(x) = 10x - 6}$$

$$H(x) = {\color{red}-2x} \times (-3 + 4x)$$
$$H(x) = \underbrace{{\color{red}(-2x)} \times (-3)}_{+6x} + \underbrace{{\color{red}(-2x)} \times 4x}_{-8x^2}$$
$$\boxed{H(x) = -8x^2 + 6x}$$

<u>Remarque</u> : 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.

$$I(x) = {\color{red}-3} \times (2 - x) \quad - (x - 5)$$
$$I(x) = \underbrace{-6}_{{\color{red}(-3)}\times 2} \quad \underbrace{+\ 3x}_{{\color{red}(-3)}\times(-x)} \quad - x + 5$$

Puis on réduit

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

$$J(x) = {\color{red}-3x} \times (2 - x) \qquad {\color{green}-\ 5}(x - 4)$$
$$J(x) = \underbrace{-6x}_{{\color{red}(-3x)}\times 2} \quad \underbrace{+\ 3x^2}_{{\color{red}(-3x)}\times(-x)} \quad \underbrace{-5x}_{{\color{green}(-5)}\times x} \quad \underbrace{+\ 20}_{{\color{green}(-5)}\times(-4)}$$

Puis on réduit

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

4. Distributivité double.

$$\boxed{({\color{red}k} + {\color{green}p}) \times (a + b) = {\color{red}k} \times a + {\color{red}k} \times b + {\color{green}p} \times a + {\color{green}p} \times b}$$

$$K(x) = ({\color{red}4x} + {\color{green}2})(5 - 3x)$$
$$K(x) = \underbrace{20x}_{{\color{red}4x}\times 5} \quad \underbrace{-12x^2}_{{\color{red}4x}\times(-3x)} \quad \underbrace{+10}_{{\color{green}2}\times 5} \quad \underbrace{-6x}_{{\color{green}2}\times(-3x)}$$
$$K(x) = -12x^2 \underbrace{+14x}_{20x-6x} + 10$$
$$\boxed{K(x) = -12x^2 + 14x + 10}$$

$$L(x) = ({\color{red}-5x} + {\color{green}1})(1 + 5x)$$
$$L(x) = \underbrace{-5x}_{{\color{red}-5x}\times 1} \quad \underbrace{-25x^2}_{{\color{red}-5x}\times 5x} \quad \underbrace{+1}_{{\color{green}1}\times 1} \quad \underbrace{+5x}_{{\color{green}1}\times 5x}$$
$$L(x) = -25x^2 \underbrace{+0x}_{-5x+5x} + 1$$
$$\boxed{L(x) = -25x^2 + 1}$$

$$M(x) = ({\color{red}4x} + {\color{green}2})(5 - 3x) \ {\color{blue}-\ 2}({\color{red}-5x} + {\color{green}1})(1 + 5x)$$
$$M(x) = \underbrace{20x}_{{\color{red}4x}\times 5} \quad \underbrace{-12x^2}_{{\color{red}4x}\times(-3x)} \quad \underbrace{+10}_{{\color{green}2}\times 5} \quad \underbrace{-6x}_{{\color{green}2}\times(-3x)}$$
$$\boxed{-2} \times \left(\underbrace{-5x}_{{\color{red}-5x}\times 1} \quad \underbrace{-25x^2}_{{\color{red}-5x}\times 5x} \quad \underbrace{+1}_{{\color{green}1}\times 1} \quad \underbrace{+5x}_{{\color{green}1}\times 5x} \right)$$
$$+ \underbrace{10x}_{\boxed{-2}\times(-5x)} \quad \underbrace{+50x^2}_{\boxed{-2}\times(-25x^2)} \quad \underbrace{-2}_{\boxed{-2}\times 1} \quad \underbrace{-10x}_{\boxed{-2}\times 5x}$$
$$M(x) = -12x^2 + 14x + 10$$
$$M(x) = \underbrace{38x^2}_{-12x^2+50x^2} \quad \underbrace{+14x}_{14x+10x-10x} \quad \underbrace{+8}_{10-2}$$
$$\boxed{M(x) = 38x^2 + 18x + 8}$$