

Chapitre 4 : Calcul littéral

I. Sommes et produits algébriques

Rappel : Somme algébrique

Il faut additionner uniquement les termes semblables.
(= même lettre et même exposant).

- ① Additionner les coefficients (utiliser la droite graduée)
- ② Rejoindre les lettres avec les exposants.

1. Calcule :

$$1) 2x - 3x + 2y = -1x + 2y$$

$$4) -2a + 3b - 3b - a + 3a = 0$$

$$2) 4ab - 2ab + 10ab - 21ab = -9ab$$

$$5) -4a + 7a = 3a$$

$$3) 5r + 1 = /$$

$$6) 5a^2 - 2a^3 = /$$

Rappel : Produit algébrique

- ① Multiplier les nombres entre eux.
- ② Multiplier les lettres entre elles et les écrire dans l'ordre alphabétique.

2. Calcule :

$$1) 2m \cdot 3a = 6am$$

$$4) 5a \cdot b \cdot 2b = 10ab^2$$

$$2) -10x \cdot 3y = -30xy$$

$$5) x \cdot 3y \cdot 4x^2 = 12x^2y$$

$$3) 3d \cdot d^2 = 3d^3$$

$$6) 4a \cdot 2c \cdot 6b = 48abc$$



3. Réduis les expressions qui peuvent l'être :

Série 1

- 1) $2x - 5x = -3x$ 6) $7a - 2b = /$ 11) $3a - 7a + 6q - 5 = -4a + 6q - 5$
2) $-2x - 3x = -5x$ 7) $-b + 6b = 5b$ 12) $b - b = 0$
3) $x^3 - 3x^3 + 6x^2 = -2x^3 + 6x^2$ 8) $-b - b = -2b$ 13) $a^3 - 4a^2 = /$
4) $3a^2 - 4a^2 + 7a^2 = 6a^2$ 9) $3b + 2a - 2b = b + 2a$ 14) $-2xy + 3xy - 4xy = -3xy$
5) $5x^3 - x^3 = 4x^3$ 10) $3a^2 - a^2 = 2a^2$ 15) $-7bc + 4ad + 5ac = /$

Série 2

- 1) $3ab - 2ab = 1ab$ 6) $3ab \cdot (-2ab) \cdot a = -6a^3b^2$ 11) $-3a^2b \cdot 5ab^2 = -15a^3b^3$
2) $3b - 5a + 6ab = /$ 7) $3b \cdot (-5a) = -15ab$ 12) $2a^2 + 3a = /$
3) $2a^2 \cdot 3a \cdot 2x = 12a^3x$ 8) $-3b^3 + 2b^2 - b = /$ 13) $-5x^2y + 3xy^2 = /$
4) $-3b^3 \cdot 2b^2 = -6b^5$ 9) $a^2 - a = /$ 14) $a^2 \cdot (-2a) = -2a^3$
5) $5a^3 - 7a^3 = -2a^3$ 10) $5a^3 \cdot (-7a^3) \cdot a^2 = -35a^9$ 15) $7c^2d \cdot (-2c^2d) = -14c^4d^2$

Série 3

- 1) $4a + 2b = /$ 4) $(-3a) \cdot (-4b) \cdot (-2c) = -24abc$
2) $5h^3 \cdot 2h = 10h^4$ 5) $2b + 2 = /$
3) $2 \cdot 3a + 4 \cdot 5 \cdot a = 6a + 20a = 26a$ 6) $a + a^2 + a^3 + 2a = 3a + a^2 + a^3$

$$7) 6a + 2 = \text{ / }$$

$$14) a^2 \cdot 5 \cdot a^2b = 5a^4b$$

$$8) 5a^4 \cdot 4a \cdot 2a^2c = 40a^7c$$

$$15) -a - b - 2a + 3b = -3a + 2b$$

$$9) 5x^2 + 2y - 4x^2 - 3y^2 = 1x^2 + 2y - 3y^2$$

$$16) (-1) \cdot (-2b) \cdot ab^3 \cdot (-2a) = -4a^2b^4$$

$$10) 7a^2 - 2a^2 + 3a + a = 5a^2 + 4a$$

$$17) -5a \cdot (-1) \cdot (-a) = -5a^2$$

$$11) 12a - 4ab + 2ac - ab - 2ac = 12a - 5ab$$

$$18) 3a \cdot 2b^2 = 6ab^2$$

$$12) 3x^2 \cdot 3x \cdot 2y = 18x^3y$$

$$19) d \cdot (-2a) \cdot 2d^2 \cdot 3a = -12a^2d^3$$

$$13) (2x)^3 + 15x^3 = 8x^3 + 15x^3 = 23x^3$$

$$20) 3a^2b + ab^2 = \text{ / }$$

4. Entoure la bonne réponse :

	Solution 1	Solution 2	Solution 3
$2a + 2b$	$4ab$	$2b + 2a$	$4a + b$
$3a \cdot 3b$	$9ab$	$9a \cdot 9b$	$3ab$
$-2x \cdot 5y$	$-7xy$	$-10xy$	$10xy$
$5x + 2 \cdot (-x)$	$-7x$	$7x$	$3x$
$2a \cdot 3 - 3 \cdot 2a$	$6a$	0	$12a$
$7xy - 2x$	$5y$	$5xy$	$7xy - 2x$
$-5bc - bc$	-5	$-6bc$	$6bc$
$-3x \cdot (-3x) \cdot (-3x)$	$-9x$	$9x$	$-27x^3$
$3 \cdot 2x + 2 \cdot 2x$	$10x^2$	$5 \cdot 2x$	$6 \cdot 2x$
$-3x \cdot (-2y) \cdot (-z)$	$-5xyz$	$-6xyz$	$6xyz$

5. Complète par = ou ≠ :

$x + y$	≠	xy	$2x^2$	=	$2x \cdot x$
$x^2 + x^2$	≠	$2x^2$	$2x + 3y$	≠	$5xy$
$x \cdot y \cdot z$	=	$z \cdot x \cdot y$	$x + x$	≠	x^2
$2x + 2y$	≠	$2xy$	$2x \cdot 3y$	=	$6xy$
xx	≠	$2x$	$2x + y$	≠	$2y + x$

→ test

II. Suppression de parenthèses.

Théorie : Supprimer une parenthèse précédée du signe « - »

- ① Bouger le signe "-" qui est devant la ().
- ② Bouger la parenthèse.
- ③ Changer les signes des termes qui sont à l'intérieur de la ().

6. Supprime correctement les parenthèses et réduis les termes semblables :

1) $a - (2a - 3) = a - 2a + 3 = -a + 3$

2) $14 - (b - 16) = 14 - b + 16 = 30 - b$

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

4) $2x - (3x - 4y) - (x + 2) = 2x - 3x + 4y - x - 2 = -2x + 4y - 2$

Théorie : Supprimer une parenthèse précédée du signe « + »

- ① Bouger le signe "+" qui est devant la ().
- ② Bouger la ().
- ③ Garder les signes des termes qui sont à l'intérieur de la ().

7. Supprime correctement les parenthèses et réduis les termes semblables :



$$1) 4m + (3m - 20) = 4m + 3m - 20 = 7m - 20$$

$$2) 14 + (b - 16) = 14 + b - 16 = b - 2$$

$$3) (x + y) + 3x = x + y + 3x = 4x + y$$

$$4) (-2a - b) + (2a + b + c) = -2a - b + 2a + b + c = c$$

8. Associe les expressions égales :

$3a + (-a^2 + 1)$	$-3a + a^2 - 1$
$3a + (a^2 + 1)$	$3a - a^2 - 1$
$3a - (a^2 + 1)$	$3a - a^2 + 1$
$(a^2 - 1) - 3a$	$3a + a^2 - 1$
$3a - (-a^2 + 1)$	$3a + a^2 + 1$

9. Supprime les parenthèses et réduis les expressions suivantes :

$$1) x + (y + z) = x + y + z$$

$$5) a - (-b - c) = a + b + c$$

$$2) x - (y + z) = x - y - z$$

$$6) 2x - (3x - c) = 2x - 3x + c = -x + c$$

$$3) a + (b - c) = a + b - c$$

$$7) 2a + (2b - a) = 2a + 2b - a = a + 2b$$

$$4) a - (b - c) = a - b + c$$

$$8) 5x - (y - 2x) = 5x - y + 2x = 7x - y$$

$$9) 2a - 3b - (2a + 3b) = 2a - 3b - 2a - 3b = -6b$$

$$10) (2x + 3y) - (3x - 4y) = 2x + 3y - 3x + 4y = -x + 7y$$

$$11) -(2a + 7b) + (-3a + 5b) = -2a - 7b - 3a + 5b = -5a - 2b$$

$$12) a - 4 - (4 - b) - (b + a) = a - 4 - 4 + b - b - a = -8$$

10. Retrouve les erreurs commises et corrige-les.

$$x + (2y - 5z) = x - 2y - 5z$$

$$2a - (b + c) = 2a - b + c$$

$$(-x + y) - (a - b) = x + y - a + b$$

$$-(x + y) - (c + d) = -x + y - c + d$$

$$3a - 4b - (-2c + d) = 3a - 4b - 2c - d$$

→ test

III. Distributivité simple et mise en évidence

Théorie : Distributivité simple

Multiplie le facteur qui est devant ou derrière la parenthèse par chacun des termes de la parenthèse.

$$\text{ex: } -3a \cdot (b - 5c) = -3ab - 3a \cdot (-5c) \\ = -3ab + 15ac$$

11. Applique la distributivité:

$$x \cdot (y + z) = xy + xz$$

$$2a \cdot (3b + 4c) = 2a \cdot 3b + 2a \cdot 4c \\ = 6ab + 8ac$$

$$5 \cdot (b - 2c) = 5b - 5 \cdot 2c \\ = 5b - 10c$$

$$-3x^3 \cdot (3x + 2) = -3x^3 \cdot 3x - 3x^3 \cdot 2 \\ = -9x^4 - 6x^3$$

$$(a - 3b) \cdot (-2c) = a \cdot (-2c) - 3b \cdot (-2c) \\ = -2ac + 6bc$$

$$3x \cdot (x + 2) = 3x \cdot x + 3x \cdot 2 \\ = 3x^2 + 6x$$

$$(a + 3y) \cdot 5 = 5 \cdot a + 5 \cdot 3y \\ = 5a + 15y$$

$$-3x \cdot (3x - 4) = -3x \cdot 3x - 3x \cdot (-4) \\ = -9x^2 + 12x$$

$$3a \cdot (b - 2c) = 3a \cdot b + 3a \cdot (-2c) \\ = 3ab - 6ac$$

$$-4x \cdot (3x^2 + 5) = -4x \cdot 3x^2 - 4x \cdot 5 \\ = -12x^3 - 20x$$

$$(7 + 2a) \cdot a = 7 \cdot a + 2a \cdot a \\ = 7a + 2a^2$$

$$-5a \cdot (-2 - 7a) = -5a \cdot (-2) - 5a \cdot (-7a) \\ = 10a + 35a^2$$

$$7 \cdot (-x - 3) = 7 \cdot (-x) - 7 \cdot 3 \\ = -7x - 21$$

$$-4 \cdot (x - 2y) = -4 \cdot x - 4 \cdot (-2y) \\ = -4x + 8y$$

1. 40 people like apples.

2. 30 people like oranges.

3. 20 people like bananas.

4. 10 people like pears.

5. 5 people like all four fruits.

Let A be the set of people who like apples.



Let O be the set of people who like oranges.

$$n(A) = 40, n(O) = 30, n(B) = 20, n(P) = 10$$

$$n(A \cap O) = 10, n(A \cap B) = 5, n(A \cap P) = 5$$

$$n(O \cap B) = 5, n(O \cap P) = 5, n(B \cap P) = 5$$

$$n(A \cap O \cap B) = 5, n(A \cap O \cap P) = 5$$

$$n(A \cap O \cap B \cap P) = 5$$

$$n(A \cap B \cap P) = 5, n(O \cap B \cap P) = 5$$

$$n(A \cap B) = 5, n(O \cap P) = 5$$

$$n(O \cap B) = 5, n(O \cap P) = 5, n(B \cap P) = 5$$

$$n(A \cap O \cap B) = 5, n(A \cap O \cap P) = 5$$

$$n(A \cap O \cap B \cap P) = 5$$

$$n(A \cap O \cap B \cap P) = 5$$

$$n(A \cap B \cap P) = 5, n(O \cap B \cap P) = 5$$

$$n(A \cap B) = 5, n(O \cap P) = 5$$

$$(3a - 5b) \cdot (-2) = -2 \cdot 3a - 2 \cdot (-5b) \\ = -6a + 10b$$

$$3a \cdot (a - 3) = 3a \cdot a + 3a \cdot (-3) \\ = 3a^2 - 9a$$

$$(5x - 1) \cdot 4x = 4x \cdot 5x + 4x \cdot (-1) \\ = 20x^2 - 4x$$

$$(5a - 3) \cdot 2a^2 = 2a^2 \cdot 5a + 2a^2 \cdot (-3) \\ = 10a^3 - 6a^2$$

$$(a^2 + b + 2c) \cdot (-2) = -2 \cdot a^2 - 2 \cdot b - 2 \cdot 2c \\ = -2a^2 - 2b - 4c$$

$$5 \cdot (1 - b) = 5 \cdot 1 + 5 \cdot (-b) \\ = 5 - 5b$$

$$a^2 \cdot (3a^2 - 3) = a^2 \cdot 3a^2 + a^2 \cdot (-3) \\ = 3a^4 - 3a^2$$

$$-2b \cdot (2b^2 + 1) = -2b \cdot 2b^2 - 2b \cdot 1 \\ = -4b^3 - 2b$$

$$3c^2 \cdot (2c + 3c^3) = 3c^2 \cdot 2c + 3c^2 \cdot 3c^3 \\ = 6c^3 + 9c^5$$

$$2b \cdot (a + b + 3c) = 2b \cdot a + 2b \cdot b + 2b \cdot 3c \\ = 2ab + 2b^2 + 6bc$$

→ test

Théorie : Mise en évidence → l'inverse de la simplification distributive.

$$\textcircled{24} \cdot 3 + \textcircled{24} \cdot 5 = \textcircled{24} \cdot (3 + 5) \\ = 24 \cdot 15$$

$$\textcircled{7}x + \textcircled{7} \cdot 5 = \textcircled{7} \cdot (x + 5)$$

$$2x^2 - 3x = 2 \cdot x \cdot x - 3x \\ = x \cdot (2x - 3)$$

12. Mets le ou les facteur(s) commun(s) en évidence :

$$1) \textcircled{3}a + \textcircled{3}b = \textcircled{3} \cdot (a + b)$$

$$10) \textcircled{4}ab - \textcircled{4}ac = \textcircled{4}a \cdot (b - c)$$

$$2) 5x - 25x^2 = \textcircled{5}x - \textcircled{5} \cdot \textcircled{5} \cdot x \cdot x \\ = 5x \cdot (1 - 5x)$$

$$11) 4a^2 - 16a^4 + 8a = \textcircled{4} \cdot \textcircled{a} \cdot \textcircled{a} - \textcircled{4} \cdot \textcircled{4} \cdot \textcircled{a} \cdot \textcircled{a} \cdot \textcircled{a} \cdot \textcircled{a} + \textcircled{4} \cdot \textcircled{2} \cdot \textcircled{a} \\ = 4a \cdot (a - 4a^3 + 2)$$

$$3) 7x + 21 = \textcircled{7}x + \textcircled{7} \cdot 3 \\ = 7 \cdot (x + 3)$$

$$12) 35 + 7a = \textcircled{7} \cdot 5 + \textcircled{7} \cdot a \\ = 7 \cdot (5 + a)$$

$$4) -2a - 22 = -\textcircled{2}a - \textcircled{2} \cdot 11 \\ = 2 \cdot (-a - 11)$$

$$13) 10x - 5 = \textcircled{2} \cdot \textcircled{5} \cdot x - \textcircled{5} \\ = 5 \cdot (2x - 1)$$

$$5) 12ab - 4ac = \textcircled{4} \cdot \textcircled{3} \cdot \textcircled{a} \cdot b - \textcircled{4} \cdot \textcircled{a} \cdot c \\ = 4a \cdot (3b - c)$$

$$14) 5a + 15b + 25c = \textcircled{5}a + \textcircled{5} \cdot 3b + \textcircled{5} \cdot 5c \\ = 5 \cdot (a + 3b + 5c)$$

$$6) 3xy - 6y = \textcircled{3}x \cdot \textcircled{y} - \textcircled{2} \cdot \textcircled{3}y \\ = 3y \cdot (x - 2)$$

$$15) 32ab + 24a = \textcircled{8} \cdot \textcircled{4} \cdot \textcircled{a} \cdot b + \textcircled{8} \cdot 3a \\ = 8a \cdot (4b + 3)$$

$$7) 8a^2 + 24a = \textcircled{8} \cdot \textcircled{a} \cdot a + \textcircled{8} \cdot 3a \\ = 8a \cdot (a + 3)$$

$$16) 15a^2 + 25a = \textcircled{3} \cdot \textcircled{5} \cdot \textcircled{a} \cdot a + \textcircled{5} \cdot 5a \\ = 5a \cdot (3a + 5)$$

$$8) 4a^2 + 7ab = \textcircled{a} \cdot \textcircled{4} \cdot a + \textcircled{a} \cdot \textcircled{7} \cdot b \\ = a \cdot (4a + 7b)$$

$$17) 13a^2b + 39ab^2c = \textcircled{13} \cdot \textcircled{a} \cdot \textcircled{a} \cdot b + \textcircled{3} \cdot \textcircled{13} \cdot \textcircled{a} \cdot b \cdot b \cdot c \\ = 13ab \cdot (a + 3bc)$$

→ test



IV. Distributivité double.

Théorie : Double distributivité

$$\begin{aligned}(x+3) \cdot (x+5) &= x \cdot x + x \cdot 5 + 3 \cdot x + 3 \cdot 5 \\ &= x^2 + 5x + 3x + 15 \\ &= x^2 + 8x + 15\end{aligned}$$

13. Applique la double distributivité et réduis les éventuels termes semblables :

$$1) (a+b) \cdot (c+d) = ac + ad + bc + bd$$

$$2) (a-3) \cdot (b-5) = ab - 5a - 3b + 15$$

$$3) (a+2b) \cdot (c+2d) = ac + 2ad + 2bc + 4bd$$

$$4) (2a+3) \cdot (2b-4) = 4ab - 8a + 6b - 12$$

$$5) (3x-4y) \cdot (2x-4y) = 6x^2 - 12xy - 8xy + 16y^2 = 6x^2 - 20xy + 16y^2$$

$$6) (3x-7) \cdot (2x-2) = 6x^2 - 6x - 14x + 14 = 6x^2 - 20x + 14$$

$$7) (-2a+3) \cdot (a+2) = -2a^2 - 4a + 3a + 6 = -2a^2 - a + 6$$

$$8) (5b-1) \cdot (5-3b) = 25b - 15b^2 - 5 + 3b = 28b - 15b^2 - 5$$

$$9) (-3-b) \cdot (4-7b) = -12 + 21b - 4b + 7b^2 = -12 + 19b + 7b^2$$

$$10) (3x-2) \cdot (-5-2x) = -15x - 6x^2 + 10 + 4x = -11x - 6x^2 + 10$$

Symbol	Meaning
$\mathbf{A}$	Matrix
$\mathbf{B}$	Matrix
$\mathbf{C}$	Matrix
$\mathbf{D}$	Matrix
$\mathbf{E}$	Matrix
$\mathbf{F}$	Matrix
$\mathbf{G}$	Matrix
$\mathbf{H}$	Matrix
$\mathbf{I}$	Matrix
$\mathbf{J}$	Matrix
$\mathbf{K}$	Matrix
$\mathbf{L}$	Matrix
$\mathbf{M}$	Matrix
$\mathbf{N}$	Matrix
$\mathbf{O}$	Matrix
$\mathbf{P}$	Matrix
$\mathbf{Q}$	Matrix
$\mathbf{R}$	Matrix
$\mathbf{S}$	Matrix
$\mathbf{T}$	Matrix
$\mathbf{U}$	Matrix
$\mathbf{V}$	Matrix
$\mathbf{W}$	Matrix
$\mathbf{X}$	Matrix
$\mathbf{Y}$	Matrix
$\mathbf{Z}$	Matrix
$\mathbf{a}$	Vector
$\mathbf{b}$	Vector
$\mathbf{c}$	Vector
$\mathbf{d}$	Vector
$\mathbf{e}$	Vector
$\mathbf{f}$	Vector
$\mathbf{g}$	Vector
$\mathbf{h}$	Vector
$\mathbf{i}$	Vector
$\mathbf{j}$	Vector
$\mathbf{k}$	Vector
$\mathbf{l}$	Vector
$\mathbf{m}$	Vector
$\mathbf{n}$	Vector
$\mathbf{o}$	Vector
$\mathbf{p}$	Vector
$\mathbf{q}$	Vector
$\mathbf{r}$	Vector
$\mathbf{s}$	Vector
$\mathbf{t}$	Vector
$\mathbf{u}$	Vector
$\mathbf{v}$	Vector
$\mathbf{w}$	Vector
$\mathbf{x}$	Vector
$\mathbf{y}$	Vector
$\mathbf{z}$	Vector
$\mathbf{A}_1$	Matrix
$\mathbf{A}_2$	Matrix
$\mathbf{A}_3$	Matrix
$\mathbf{A}_4$	Matrix
$\mathbf{A}_5$	Matrix
$\mathbf{A}_6$	Matrix
$\mathbf{A}_7$	Matrix
$\mathbf{A}_8$	Matrix
$\mathbf{A}_9$	Matrix
$\mathbf{A}_{10}$	Matrix
$\mathbf{A}_{11}$	Matrix
$\mathbf{A}_{12}$	Matrix
$\mathbf{A}_{13}$	Matrix
$\mathbf{A}_{14}$	Matrix
$\mathbf{A}_{15}$	Matrix
$\mathbf{A}_{16}$	Matrix
$\mathbf{A}_{17}$	Matrix
$\mathbf{A}_{18}$	Matrix
$\mathbf{A}_{19}$	Matrix
$\mathbf{A}_{20}$	Matrix
$\mathbf{A}_{21}$	Matrix
$\mathbf{A}_{22}$	Matrix
$\mathbf{A}_{23}$	Matrix
$\mathbf{A}_{24}$	Matrix
$\mathbf{A}_{25}$	Matrix
$\mathbf{A}_{26}$	Matrix
$\mathbf{A}_{27}$	Matrix
$\mathbf{A}_{28}$	Matrix
$\mathbf{A}_{29}$	Matrix
$\mathbf{A}_{30}$	Matrix
$\mathbf{A}_{31}$	Matrix
$\mathbf{A}_{32}$	Matrix
$\mathbf{A}_{33}$	Matrix
$\mathbf{A}_{34}$	Matrix
$\mathbf{A}_{35}$	Matrix
$\mathbf{A}_{36}$	Matrix
$\mathbf{A}_{37}$	Matrix
$\mathbf{A}_{38}$	Matrix
$\mathbf{A}_{39}$	Matrix
$\mathbf{A}_{40}$	Matrix
$\mathbf{A}_{41}$	Matrix
$\mathbf{A}_{42}$	Matrix
$\mathbf{A}_{43}$	Matrix
$\mathbf{A}_{44}$	Matrix
$\mathbf{A}_{45}$	Matrix
$\mathbf{A}_{46}$	Matrix
$\mathbf{A}_{47}$	Matrix
$\mathbf{A}_{48}$	Matrix
$\mathbf{A}_{49}$	Matrix
$\mathbf{A}_{50}$	Matrix
$\mathbf{A}_{51}$	Matrix
$\mathbf{A}_{52}$	Matrix
$\mathbf{A}_{53}$	Matrix
$\mathbf{A}_{54}$	Matrix
$\mathbf{A}_{55}$	Matrix
$\mathbf{A}_{56}$	Matrix
$\mathbf{A}_{57}$	Matrix
$\mathbf{A}_{58}$	Matrix
$\mathbf{A}_{59}$	Matrix
$\mathbf{A}_{60}$	Matrix
$\mathbf{A}_{61}$	Matrix
$\mathbf{A}_{62}$	Matrix
$\mathbf{A}_{63}$	Matrix
$\mathbf{A}_{64}$	Matrix
$\mathbf{A}_{65}$	Matrix
$\mathbf{A}_{66}$	Matrix
$\mathbf{A}_{67}$	Matrix
$\mathbf{A}_{68}$	Matrix
$\mathbf{A}_{69}$	Matrix
$\mathbf{A}_{70}$	Matrix
$\mathbf{A}_{71}$	Matrix
$\mathbf{A}_{72}$	Matrix
$\mathbf{A}_{73}$	Matrix
$\mathbf{A}_{74}$	Matrix
$\mathbf{A}_{75}$	Matrix
$\mathbf{A}_{76}$	Matrix
$\mathbf{A}_{77}$	Matrix
$\mathbf{A}_{78}$	Matrix
$\mathbf{A}_{79}$	Matrix
$\mathbf{A}_{80}$	Matrix
$\mathbf{A}_{81}$	Matrix
$\mathbf{A}_{82}$	Matrix
$\mathbf{A}_{83}$	Matrix
$\mathbf{A}_{84}$	Matrix
$\mathbf{A}_{85}$	Matrix
$\mathbf{A}_{86}$	Matrix
$\mathbf{A}_{87}$	Matrix
$\mathbf{A}_{88}$	Matrix
$\mathbf{A}_{89}$	Matrix
$\mathbf{A}_{90}$	Matrix
$\mathbf{A}_{91}$	Matrix
$\mathbf{A}_{92}$	Matrix
$\mathbf{A}_{93}$	Matrix
$\mathbf{A}_{94}$	Matrix
$\mathbf{A}_{95}$	Matrix
$\mathbf{A}_{96}$	Matrix
$\mathbf{A}_{97}$	Matrix
$\mathbf{A}_{98}$	Matrix
$\mathbf{A}_{99}$	Matrix
$\mathbf{A}_{100}$	Matrix

1.1. The first part of the paper is devoted to the study of the properties of the matrix $\mathbf{A}$.

$$\mathbf{A} = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{pmatrix}$$

$$\mathbf{C} = \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \\ c_{31} & c_{32} & c_{33} \end{pmatrix}$$

$$\mathbf{D} = \begin{pmatrix} d_{11} & d_{12} & d_{13} \\ d_{21} & d_{22} & d_{23} \\ d_{31} & d_{32} & d_{33} \end{pmatrix}$$

$$\mathbf{E} = \begin{pmatrix} e_{11} & e_{12} & e_{13} \\ e_{21} & e_{22} & e_{23} \\ e_{31} & e_{32} & e_{33} \end{pmatrix}$$

$$\mathbf{F} = \begin{pmatrix} f_{11} & f_{12} & f_{13} \\ f_{21} & f_{22} & f_{23} \\ f_{31} & f_{32} & f_{33} \end{pmatrix}$$

$$\mathbf{G} = \begin{pmatrix} g_{11} & g_{12} & g_{13} \\ g_{21} & g_{22} & g_{23} \\ g_{31} & g_{32} & g_{33} \end{pmatrix}$$

$$\mathbf{H} = \begin{pmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{pmatrix}$$

$$\mathbf{I} = \begin{pmatrix} i_{11} & i_{12} & i_{13} \\ i_{21} & i_{22} & i_{23} \\ i_{31} & i_{32} & i_{33} \end{pmatrix}$$

$$\mathbf{J} = \begin{pmatrix} j_{11} & j_{12} & j_{13} \\ j_{21} & j_{22} & j_{23} \\ j_{31} & j_{32} & j_{33} \end{pmatrix}$$

$$\mathbf{K} = \begin{pmatrix} k_{11} & k_{12} & k_{13} \\ k_{21} & k_{22} & k_{23} \\ k_{31} & k_{32} & k_{33} \end{pmatrix}$$

$$11) (a+c) \cdot (d+f) = ad + af + cd + cf$$

$$12) (2a+b) \cdot (3c+d) = 6ac + 2ad + 3bc + bd$$

$$13) (4a+2) \cdot (-3c+5) = -12ac + 20a - 6c + 10$$

$$14) (3a-1) \cdot (5b+1) = 15ab + 3a - 5b - 1$$

$$15) (2x-3) \cdot (3x^3-5) = 6x^4 - 10x - 9x^3 + 15$$

$$16) (-a+3b) \cdot (2a-b) = -2a^2 - ab + 6ab - 3b^2 = -2a^2 + 5ab - 3b^2$$

$$17) (2a-1) \cdot (a+2) = 2a^2 + 4a - a - 2 = 2a^2 + 3a - 2$$

$$18) (-a-2b) \cdot (-a-4b) = a^2 + 4ab + 2ab + 8b^2 = a^2 + 6ab + 8b^2$$

$$19) (-3x-y) \cdot (y-5x) = -3xy + 15x^2 - y^2 + 5xy = 2xy + 15x^2 - y^2$$

$$20) (4x+5) \cdot (2x+7) = 8x^2 + 28x + 10x + 35 = 8x^2 + 38x + 35$$

14. Calcule sans utiliser la calculatrice et en appliquant la double distributivité

$$23.49 = (20+3) \cdot (50-1) = 1000 - 20 + 150 - 3 = 1127$$

$$99.38 = (100-1) \cdot (40-2) = 4000 - 200 - 40 + 2 = 3762$$

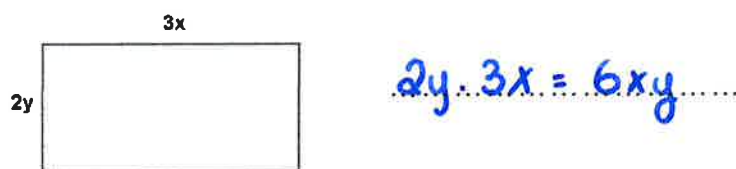
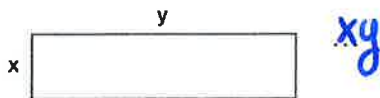
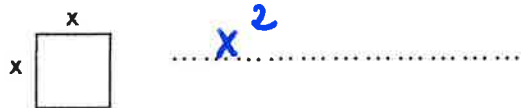
$$19.101 = (20-1) \cdot (100+1) = 2000 + 20 - 100 - 1 = 1919$$

$$31.98 = (30+1) \cdot (100-2) = 3000 - 60 + 100 - 2 = 3038$$

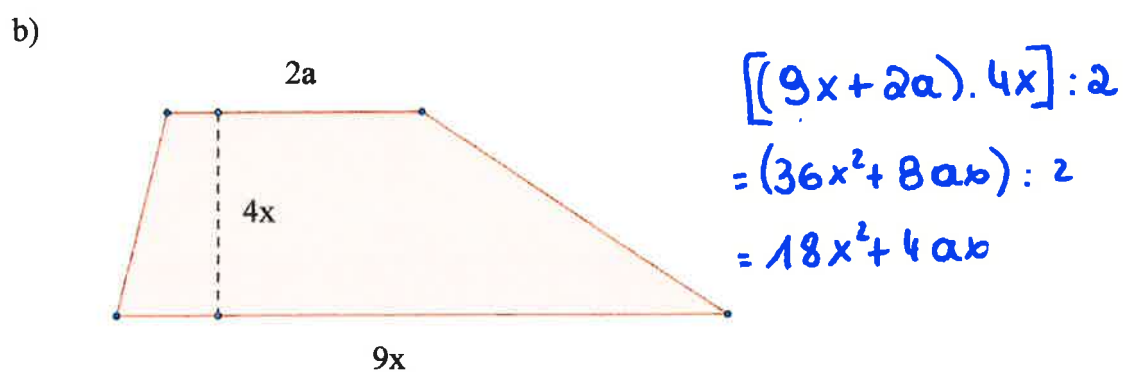
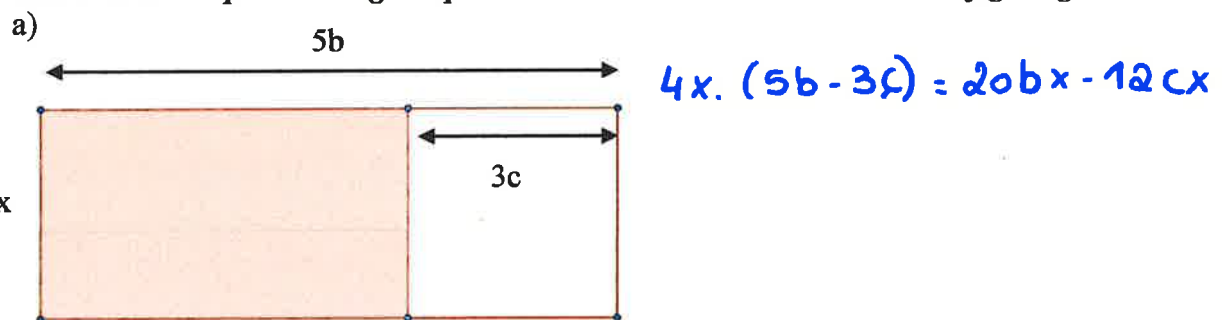
→ test

V. Calcul d'aires

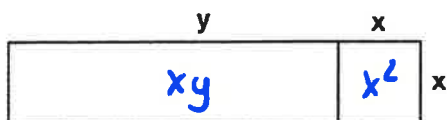
15. Exprime l'aire des figures suivantes :



16. Ecris une expression algébrique réduite au maximum de l'aire de la figure grise :



17. Exprime l'aire des rectangles dessinés sous forme d'un produit puis sous forme d'une somme réduite.

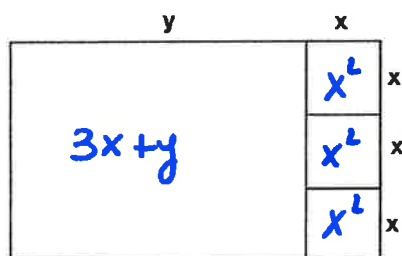


Somme

a) $x^2 + xy$

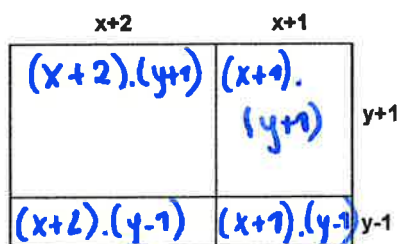
Produit

b) $(x+y) \cdot x$



a) $x^2 + x^2 + x^2 + 3xy$

b) $(x+y) \cdot (x+x+x)$
 $= (x+y) \cdot 3x$



a)

b) $(x+2+x+1) \cdot (y+1+y-1)$
 $= (2x+3) \cdot 2y$

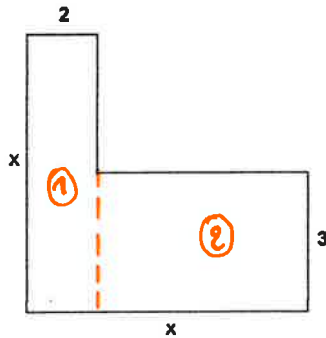
$$(x+2) \cdot (y+1) + (x+1) \cdot (y+1) + (x+2) \cdot (y-1) + (x+1) \cdot (y-1) =$$

$$xy + x + 2y + 2 + xy + x + y + 1 + xy - x + 2y - 2 + xy - x + y - 1 =$$

$$4xy + 6y$$

→ test

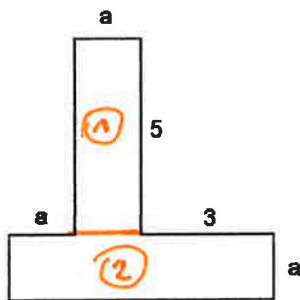
18. Exprime sous forme d'une somme l'aire des figures en utilisant uniquement les longueurs fournies sur le dessin.



Aire ①: $2 \cdot x$

Aire ②: $3 \cdot (x - 2) = 3x - 6$

Aire totale: $2x + 3x - 6 = 5x - 6$



Aire ①: $a \cdot 5 = 5a$

Aire ②: $(a + a + 3) \cdot a = (2a + 3) \cdot a$
 $= 2a^2 + 3a$

Aire totale: $5a + 2a^2 + 3a = 8a + 2a^2$

→ test général

