

73] Soient les monômes $16a^3x^2y$, $\frac{1}{4}ax^5$, $-0,3axy$ et πax^2y^3 .

Pour chaque monôme, indique:

	$16a^3x^2y$	$\frac{1}{4}ax^5$	$-0,3axy$	πax^2y^3
a) son coefficient	16	$\frac{1}{4}$	-0,3	π
b) sa partie littérale	a^3x^2y	ax^5	axy	ax^2y^3
c) son degré par rapport à chacune des variables.				
à a	3	1	1	1
à x	2	5	1	2
à y	1	0	1	3

74] Indique le degré des polynômes suivants par rapport à chacune des variables qu'ils contiennent :

	a	b	c	x	y	z	m	n	p	s
a) $8a^3b^2 - 7ab^5c$	3	5	1							
b) $13x^5yz + x^3y^2 - 47x$				5	2	1				
c) $m^3n + 13amn^3 - 5m^4n - 7amn$							4	3		
d) $12p^3s^2 - 15ps + 8p^2s^5$									3	5

75] Effectue les sommes suivantes en utilisant la distributivité de la multiplication par rapport à l'addition:

a) $5x + 3y - 2x =$

$3x + 3y$

b) $7a^3x + 3a^3x - 10a^3x =$

$ax^3(7 + 3 - 10) = 0$

c) $4a + 3b - 5a + 2b =$

$4a - 5a + 3b + 2b =$

$-a + 5b$

d) $a^2x^3 - 5a^3x^2 - 6a^3x^2 =$

$a^2x^3 - 11a^3x^2$

e)
$$\left\{ \begin{array}{l} \frac{1}{3}c + \frac{3}{4}c - \frac{1}{2}c = \\ c\left(\frac{4}{12} + \frac{9}{12} - \frac{6}{12}\right) = \\ \frac{7}{12}c \end{array} \right.$$

f)
$$\left\{ \begin{array}{l} \frac{4}{5}a^3d^2 - \frac{1}{4}a^3d^2 + 0,6a^3d^2 = \\ a^3d^2\left(\frac{16}{20} - \frac{5}{20} + \frac{12}{20}\right) = \\ \frac{23}{20}a^3d^2 \end{array} \right.$$

g) $-0,4x^2y + 5xy^2 - 0,19xy^2 + 0,56x^2y =$

$x^2y(-0,4 + 0,56) + xy^2(5 - 0,19) =$

$0,16x^2y + 4,81xy^2$

h)
$$\left\{ \begin{array}{l} 4,6x^3y - \frac{3}{5}x^3y + \frac{1}{3}x^3y = \\ x^3y\left(\frac{46}{10} - \frac{3}{5} + \frac{1}{3}\right) = \\ x^3y\left(\frac{276}{60} - \frac{36}{60} + \frac{20}{60}\right) = \\ \frac{13}{3}x^3y \end{array} \right.$$

76] Effectue et réduis les termes semblables:

a) $3x^2 - 8 + 5x^3 - 5x^2 - 1 =$

$5x^3 - 2x - 9$

b) $5xy \cdot xy - 2x^4 + 4xy \cdot x^2 - 3x^2y^2 - x^4 =$

$-3x^4 + 4x^3y + 2x^2y^2$

c) $9a^2x^4 + 9a^3x^2 - 6a^3x^2 - 13a^3x^2 =$

$9a^2x^4 - 10a^3x^2$

d)
$$\left\{ \begin{array}{l} \frac{1}{6}b^2y + \frac{3}{4}ab^2 - \frac{5}{6}ab^2 + \frac{2}{3}b^2y = \\ ab^2\left(\frac{9}{12} - \frac{10}{12}\right) + b^2y\left(\frac{1}{6} + \frac{4}{6}\right) = \\ \frac{5}{6}b^2y - \frac{ab^2}{12} \end{array} \right.$$

77] Réduis les polynômes suivants, ordonne-les par rapport aux puissances décroissantes de x et indique leur degré par rapport à x:

- | | | |
|--|-------|---|
| a) $2x^2 + y^2 + 3x = 2x^2 + 3x + y^2$ | degré | 2 |
| b) $7bx^3 + 2bx^2 - 10bx^3 = -3bx^3 + 2bx^2$ | | 3 |
| c) $x^3y - 2x^3y + 3ax - 6ax = -x^3y - 3ax$ | | 3 |
| d) $x^2 - 2xy^2 - \frac{1}{2}x^2 - \frac{3}{4}xy^2 + xy^2 = -\frac{7}{4}xy^2 + \frac{1}{2}x^2$ | | 2 |
| e) $0,36x^3 - 0,75x^2 + \frac{3}{4}xy^2 - \frac{9}{25}x^3 = 0x^3 + 0x^2 = 0$ | | 0 |
| f) $\frac{1}{5}ax^2 \cdot \frac{5}{2}a + \frac{1}{2}a^2x^2 - \frac{4}{3}ax^5 + \frac{1}{3}ax^5 = -ax^5 + a^2x^2$ | | 5 |

78] Quel est l'opposé du polynôme $-3ax + 2bx^2 - 8$?

$$= +3ax - 2bx^2 + 8$$

79] Ecris l'opposé des polynômes:

a) $\text{opp}[5x - 6y + 3] = -5x + 6y - 3$

b) $\text{opp}[-6ay + 5c^3 - 4a^2x^3] = 6ay - 5c^3 + 4a^2x^3$

c) $\text{opp}\left[-\frac{1}{5}a + \frac{1}{3}xy^2 - xy^3\right] = +\frac{1}{5}a - \frac{1}{3}xy^2 + xy^3$

d) $\text{opp}[8a^3x - 4ax^3 + 3ax^3] = -8a^3x + ax^3$

e) $\text{opp}\left[6cd^2 - \frac{1}{2}cd^2 + 0,7d^2\right] = -\frac{11}{2}cd^2 - 0,7d^2$

f) $\text{opp}[-3abc - 7,5ab + 3,7ab + 0,26abc] = 2,74abc + 3,8ab$

80] Effectue et réduis les termes semblables:

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

b) $x^2 + 2bx - (cx + bx) = x^2 + bx - cx$

c) $x^2 - (2bx - cx) + 2bx = x^2 + cx$

d) $(x^2 - 2bx) + (cx + 2bx) = x^2 + cx$

e) $\left(3c^2 + \frac{1}{2}b^3\right) + \left(\frac{2}{3}b^3 - 4c^2\right) = \frac{7}{6}b^3 - c^2$

f) $3c^2 \cdot \frac{1}{2}b^3 + \frac{2}{3}b^3 - 4c^2 = \frac{3}{2}b^3c^2 + \frac{2}{3}b^3 - 4c^2$

g) $3c^2 - \left(\frac{1}{2}b^3 + \frac{2}{3}b^3\right) - 4c^2 = -\frac{7}{6}b^3 - c^2$

h) $\left(3c^2 + \frac{1}{2}b^3\right) - \left(\frac{2}{3}b^3 - 4c^2\right) = -\frac{1}{6}b^3 + 7c^2$

81] Soient les polynômes

$$A = 1 - c^2$$

$$B = 2c^2 - 3c + 7$$

$$C = c - 3$$

a) $A + B + C = c^2 - 2c + 5$

b) $A + B - C = c^2 - 4c + 11$

c) $A - (B + C) = -3c^2 + 2c - 3$

d) $\frac{1}{2}A + 2(B + C) = \frac{7}{2}c^2 + 4c + \frac{17}{2}$

e) $\frac{1}{3}B + 3C = \frac{3}{2}c^2 + 2c - \frac{20}{3}$

f) $4A - \frac{4}{3}C = -4c^2 - \frac{4}{3}c + 8$

82] Calcule la valeur numérique de l'expression si $x = 0,5$:

$$(x^3 - 4x^2 + 3) - (6x^2 - 4x) - (x^3 - 2x^2 + x - 1) =$$

$$x^3 - 4x^2 + 3 - 6x^2 + 4x - x^3 + 2x^2 - x + 1 =$$

$$-8x^2 + 3x + 4 =$$

$$-8\left(\frac{1}{4}\right) + 3\left(\frac{1}{2}\right) + 4 = \frac{7}{2}$$

83] Effectue et réduis les monômes semblables:

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

$$6x^2 - 3y - 2y^2 - 2x^2 =$$

$$4x^2 - 3y - 2y^2$$

b) $3x^2(4 - 3x + 2x^2) - 4x(2x^3 - 3x^2 + 5x) =$

$$12x^2 - 9x^3 + 6x^4 - 8x^4 + 12x^3 - 20x^2 =$$

$$-2x^4 + 3x^3 - 8x^2$$

c)
$$\left\{ \begin{array}{l} \frac{1}{3}(x - 3) + (x + 3) - \frac{1}{4}(x + 4) = \\ \frac{1}{3}x - 1 + x + 3 - \frac{1}{4}x - 1 = \\ 1 + \frac{x}{12} \end{array} \right.$$

$$d) \begin{cases} \frac{x}{2}(2x-5) + \frac{x}{5}(-2x+1) - \frac{x}{9}(4x-6) = \\ x^2 - \frac{5}{2}x - \frac{2}{5}x^2 + \frac{x}{5} - \frac{4}{9}x^2 + \frac{6}{9}x = \end{cases} \quad \frac{7}{45}x^2 - \frac{49}{30}x$$

84] Effectue et réduis les monômes semblables:

a) $3a + 2 - [4a - (3 - 2a)] - 5 =$

$$3a + 2 - 4a + 3 - 2a - 5 =$$

$$-3a$$

b) $4x - \{2x - [3y - (5x - 4y) + 3x]\} - 2y =$

$$4x - 2x + 3y - 5x + 4y + 3x - 2y =$$

$$5y$$

c) $5m - [6n^2 + 2(m + n^2) - 3m] =$

$$5m - 6n^2 - 2m - 2n^2 + 3m =$$

$$6m - 8n^2$$

d) $\{2[8c^3 - 2c(4c^2 - 12)] - 24c\} \cdot 3 =$

$$\{2[8c^3 - 8c^3 + 24c] - 24c\} \cdot 3 =$$

$$72c$$

85] Effectue et réduis les monômes semblables:

a) $[-2c - (-4c + 5) - 8] - (a - b - c) - [(2a - b) + (3b - 5 + 6)] =$

$$[-2c + 4c - 5 - 8] - a + b + c - [2a - b + 3b - 5 + 6] =$$

$$-2c + 4c - 5 - 8 - a + b + c - 2a + b - 3b + 5 - 6 =$$

$$-3a - b + 3c - 14$$

b) $15y^2 - [y^2 - (x - y^2)] - (-6x + 6y^2) - (x - y^2) - (-x - 5y^2) =$

$$15y^2 - [y^2 - x + y^2] + 6x - 6y^2 - x + y^2 + x + 5y^2 =$$

$$15y^2 - y^2 + x - y^2 + 6x - 6y^2 - x + y^2 + x + 5y^2 =$$

$$7x + 12y^2$$

c) $48a - [3a - (9a - 5) - (16a - 2)] - (5a - 9) - [-(3a - b)] - (-b) =$

$$48a - [3a - 9a + 5 - 16a + 2] - 5a + 9 - [-3a + b] + b =$$

$$48a - 3a + 9a - 5 + 16a - 2 - 5a + 9 + 3a - b + b =$$

$$68a + 2$$

d) $5x^2 - (3y - 8) + [(x^2 + y - 24) - (-x^2 + 8 - 2y)] - [-x^2 - (-x^2) - (x^2 - y)] =$

$$5x^2 - 3y + 8 + [x^2 + y - 24 + x^2 - 8 + 2y] - [-x^2 + x^2 - x^2 + y] =$$

$$5x^2 - 3y + 8 + x^2 + y - 24 + x^2 - 8 + 2y + x^2 - x^2 + x^2 - y] =$$

$$8x^2 - y - 24$$

86] Effectue et réduis les termes semblables :

a) $3(5x - 8y) - [6x - (20x + 13y) + 40] - [-10x + 2(4x - y) - (8x + 16)] =$

$$15x - 24y - [6x - 20x - 13y + 40] - [-10x + 8x - 2y - 8x - 16] =$$

$$15x - 24y - 6x + 20x + 13y - 40 + 10x - 8x + 2y + 8x + 16 =$$

$$39x - 9y - 24$$

b) $18a^2x - \{5a^2x + [6ax^2 - (28a^2x - 20ax^2 + a^2x^2)] - (7a^2x^2 + 4ax^2 - 20a^2x)\} =$

$$18a^2x - \{5a^2x + [6ax^2 - 28a^2x + 20ax^2 - a^2x^2] - 7a^2x^2 - 4ax^2 + 20a^2x\} =$$

$$18a^2x - \{5a^2x + 6ax^2 - 28a^2x + 20ax^2 - a^2x^2 - 7a^2x^2 - 4ax^2 + 20a^2x\} =$$

$$18a^2x - 5a^2x - 6ax^2 + 28a^2x - 20ax^2 + a^2x^2 + 7a^2x^2 + 4ax^2 - 20a^2x =$$

$$8a^2x^2 + 21a^2x - 22ax^2$$

c) $15x - \{6x - (5x \cdot 3) - [10x - (5x - 3) - (13x - 13)] - [12 - (7x - 7) - (3x + 3)] - 5\} =$

$$15x - \{6x - 15x - [10x - 5x + 3 - 13x + 13] - [12 - 7x + 7 - 3x - 3] - 5\} =$$

$$15x - \{6x - 15x - 10x + 5x - 3 + 13x - 13 - 12 + 7x - 7 + 3x + 3 - 5\} =$$

$$15x - 6x + 15x + 10x - 5x + 3 - 13x + 13 + 12 - 7x + 7 - 3x - 3 + 5 =$$

$$6x + 37$$

87] Effectue :

a) $(a + x)(b + y) = ab + ay + bx + xy$

b) $a + x(b + y) = a + bx + xy$

c) $(a + x)b + y = ab + bx + y$

d) $(a - x)(b + y) = ab + ay - bx - xy$

e) $a - x(b + y) = a - bx - xy$

f) $(a - x)(b - y) = ab - ay - bx + xy$

g) $(a - x)b - y = ab - bx - y$

h) $(a - x)(b - y) = abx - axy$

88] Effectue :

$$\begin{aligned} \text{a) } (2x + 3y)(3y - 2y) &= \\ 6xy - 4xy + 9y^2 - 6y^2 &= \\ 2xy + 3y^2 & \end{aligned}$$

$$\text{b) } (2x + 3y)(3y^2 - 2x) =$$

$$6x^2y^2 - 4x^3 + 9y^3 - 6xy$$

$$\left(\frac{1}{4}a + \frac{1}{3}b \right) \left(\frac{2}{3}b - \frac{3}{5}a \right) =$$

$$\text{c) } \left\{ \begin{aligned} \frac{1}{6}ab - \frac{3}{20}a^2 + \frac{2}{9}b^2 - \frac{1}{5}ab &= \\ -\frac{3}{20}a^2 - \frac{1}{30}ab + \frac{2}{9}b^2 & \end{aligned} \right.$$

$$\text{d) } (5x + 3y^2)(8 + 5x) =$$

$$40x + 25x^2 + 24y^2 + 15xy^2$$

89] Effectue :

$$\text{a) } (6x - 5y)(3x + 4y) - (9x + 2y)(2x - 3y) - 2y(7y - 16x) =$$

$$18x^2 + 24xy - 15xy - 20y^2 - [18x^2 - 27xy + 4xy - 6y^2] - 14y^2 + 32xy =$$

$$18x^2 + 9xy - 20y^2 - 18x^2 + 23xy + 6y^2 - 14y^2 + 32xy =$$

$$-28y^2 + 64xy$$

$$\text{b) } (6x \cdot 5y)(3x \cdot 4y) - (9x + 2y)(2x \cdot 3y) - 2y(7y \cdot 16x) =$$

$$30xy \cdot 12xy - 54x^2y - 12xy^2 - 224xy^2 =$$

$$360x^2y^2 - 54x^2y - 236xy^2$$

$$\text{c) } (8x - 3y)(2x \cdot 4y) - (8x \cdot 3y)(2x \cdot 4y) =$$

$$64x^2y - 24xy^2 - 24xy \cdot 8xy =$$

$$64x^2y - 24xy^2 - 192x^2y^2$$

90] Effectue :

$$\text{a) } (2a^2 + 3)(7a^2 - 2b) \cdot b =$$

$$(2a^2 + 3)(7a^2b - 2b^2) =$$

$$14a^4b - 4a^2b^2 + 21a^2b - 6b^2$$

$$\text{b) } (3a^2 \cdot 3a)(3a - 2b) =$$

$$9a^3(3a - 2b) =$$

$$27a^4 - 18a^3b$$

$$\left(\frac{2}{3}a^2 - \frac{3}{4}b^2 \right) \left(\frac{2}{3}a^2 \cdot \frac{3}{4}b^2 \right) =$$

$$\text{c) } \left\{ \begin{aligned} \left(\frac{2}{3}a^2 - \frac{3}{4}b^2 \right) \left(\frac{1}{2}a^2b^2 \right) &= \\ \frac{1}{3}a^4b^2 - \frac{3}{8}a^2b^4 & \end{aligned} \right.$$

$$\text{e) } (6a^2x + 3xy)(8ax \cdot 3xy) =$$

$$(6a^2x + 3xy) \cdot 24ax^2y =$$

$$144a^3x^3y + 72x^3y^2$$

$$\text{f) } (2a - 5b^2c)(3b^3 - 2x) =$$

$$6ab^3 - 4ax - 15b^5c + 10b^2cx$$

$$\text{g) } (5xy^3 + 5)(5 - 5xy^3) =$$

$$25xy^3 - 25x^2y^6 + 25 - 25xy^3 =$$

$$-25x^2y^6 + 25$$

$$\text{h) } (x + y)(x - y)(x + y) =$$

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

$$x^3 + x^2y - xy^2 - y^3$$

$$\text{d) } -(xy - y^2) + x(x - y)y - y^2 - [xy(xy) - (x - y)(x + y)] =$$

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

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

$$\left(\frac{3}{4}r^2 - \frac{2}{3}s^2 \right) \left(\frac{3}{4}r^2 \cdot \frac{3}{4}s^2 \right) =$$

$$\text{d) } \left(\frac{3}{4}r^2 - \frac{2}{3}s^2 \right) \cdot \frac{9}{16}r^2s^2 =$$

$$\frac{27}{64}r^4s^2 - \frac{3}{8}r^2s^4$$

$$\text{e) } \left(\frac{2}{3}a - 3b \right) \left(\frac{2}{3}a + 3b \right) =$$

$$\frac{4}{9}a^2 - 9b^2$$

$$\text{f) } \left(\frac{9}{2}a + \frac{7}{2}b \right) \left(\frac{9}{2}a - \frac{7}{2}b \right) =$$

$$\frac{81}{4}a^2 - \frac{49}{4}b^2$$

91] Effectue :

$$\begin{aligned} \text{a) } (4a - 2b^2 + 3)(3a - b^2 - 1) &= \\ 12a^2 - 4ab^2 - 4a - 6ab^2 + 2b^4 + 2b^2 + 9a - 3b^2 - 3 &= \\ 12a^2 - 10ab^2 + 2b^4 - b^2 + 5a - 3 & \end{aligned}$$

$$\begin{aligned} \text{b) } (ab - 5a)(a - b \cdot 5a) &= \\ (ab - 5a)(a - 5ab) &= \\ a^2b - 5a^2b^2 - 5a^2 + 25a^2b & \end{aligned}$$

$$\begin{aligned} \text{c) } 3(x - y) + 2x(2x - y)(x + y) &= \\ 3x - 3y + (4x^2 - 2xy)(x + y) &= \\ 3x - 3y + 4x^3 + 4x^2y - 2x^2y - 2xy^2 &= \\ 4x^3 + 2x^2y - 2xy^2 + 3x - 3y & \end{aligned}$$

$$\text{d) } (2x - 3y)(5x - y)(2x + 3y) =$$

92] Effectue :

$$\begin{aligned} \text{a) } (3a + 2b)(3a - 3b)(2a - 3b) &= \\ (9a^2 - 9ab + 6ab - 6b^2)(2a - 3b) &= \\ 18a^3 - 27a^2b - 6a^2b + 9ab^2 - 12ab^2 + 18b^3 &= \\ 18a^3 - 33a^2b - 3ab^2 + 18b^3 & \end{aligned}$$

$$\begin{aligned} \text{b) } (a + b)(a - b)(a + b) &= \\ (a^2 - b^2)(a + b) &= \\ a^3 + a^2b - ab^2 - b^3 & \end{aligned}$$

93] Effectue :

$$\begin{aligned} \text{a) } 5(a + 3b)(3b + 2c) &= \\ 15ab + 10ac + 45b^2 + 30bc & \end{aligned}$$

$$\begin{aligned} \text{b) } (5 + a + 3b - 2c)(a + 3b) &= \\ 5a + 15b + a^2 + 6ab + 9b^2 - 2ac - 6bc & \end{aligned}$$

94] Effectue :

$$\begin{aligned} \text{a) } (4a^2 + 2ab + b^2)(2a - b) &= \\ 8a^3 - 4a^2b + 4a^2b - 2ab^2 + 2ab^2 - b^3 &= \\ 8a^3 - b^3 & \end{aligned}$$

$$\begin{aligned} \text{c) } (x^5 + x^4y + x^3y^2 + x^2y^3 + xy^4 + y^5)(x - y) &= \\ x^6 - x^5y + x^5y - x^4y^2 + x^4y^2 - x^3y^3 + x^3y^3 - x^2y^4 + x^2y^4 - xy^5 + xy^5 - y^6 &= \\ x^6 - y^6 & \end{aligned}$$

$$\begin{aligned} \text{d) } (4x^2 + 4xy + y^2)(2x + y) &= \\ 8x^3 + 4x^2y + 8x^2y + 4xy^2 + 2xy^2 + y^3 &= \\ 8x^3 + 12x^2y + 6xy^2 + y^3 & \end{aligned}$$

$$\begin{aligned} (10x^2 - 2xy - 15xy + 3y^2)(2x + 3y) &= \\ 20x^3 + 30x^2y - 4x^2y - 6xy^2 - 30x^2y - 45xy^2 + 6xy^2 + 9y^3 &= \\ 20x^3 - 4x^2y - 45xy^2 + 9y^3 & \end{aligned}$$

$$\begin{aligned} \text{e) } (3a - 3b)(5a - 2)(2a - 2b) &= \\ 9a^2b^2 - 4ab(5a - 2) &= \\ 36a^3b^3(5a - 2) &= \\ 180a^4b^3 - 72a^3b^3 & \end{aligned}$$

$$\begin{aligned} \text{f) } (2y - 3)(2 - 3)(4x - 3x) &= \\ (4y - 6y + 9)(4x - 3x) &= \\ 3x - 2xy & \end{aligned}$$

$$\begin{aligned} \text{c) } (4c - 1)(3c + 1)(5c + 5) &= \\ (12c^2 + 4c - 3c - 1)(5c + 5) &= \\ 60c^3 + 60c^2 + 5c^2 + 5c - 5c - 5 &= \\ 60c^3 + 65c^2 - 5 & \end{aligned}$$

$$\begin{aligned} \text{d) } (a + 1)(a^2 - a - 1) &= \\ a^3 - a^2 - a + a^2 - a - 1 &= \\ a^3 - 2a - 1 & \end{aligned}$$

$$\begin{aligned} \text{e) } (x + 3y)(x - 3y)(x + 3y - x) &= \\ (x^2 - 9y^2)(x + 3y - x) &= \\ x^3 + 3x^2y - x^3 - 9xy^2 - 27y^3 + 9xy^2 &= \\ 3xy - 27y^3 & \end{aligned}$$

$$\begin{aligned} \text{c) } (a^2 - bx + x^2)(a - x) &= \\ a^3 - a^2x - abx + bx^2 + ax^2 - x^3 & \end{aligned}$$

$$\begin{aligned} \text{d) } (a^2 - 2bx + x^2)(a + x) &= \\ a^3 + a^2x - 2abx - 2bx^2 + ax^2 + x^3 & \end{aligned}$$

$$\begin{aligned} \text{e) } (2c^2 - 3)(c^3 - 3c + 1) &= \\ 2c^5 - 9c^3 + 2c^2 + 9c - 3 & \end{aligned}$$

$$\begin{aligned} \text{b) } (3x + 5y)(9x^2 + 25y^2 - 15xy) &= \\ 27x^3 + 75xy^2 - 45^2xy + 45x^2y + 125y - 75xy^2 &= \\ 27x^3 + 125y^3 & \end{aligned}$$

$$\begin{aligned} \text{e) } (a + b - c)(a - b + c) &= \\ a^2 - ab + ac + ab - b^2 + bc - ac + bc - c^2 &= \\ a^2 - b^2 - c^2 + 2bc & \end{aligned}$$

95] Calcule la valeur numérique de l'expression suivante si $x = -5$ et $y = -9$:

$$\begin{aligned} (x^2 + xy + y^2)(x - y) - (x^3 + y^3) &= & -2y^3 &= -2 \cdot 729 = \\ x^3 - x^2y + x^2y - xy^2 + xy^2 - y^3 - x^3 - y^3 &= & -1458 & \end{aligned}$$

96] Effectue :

a) $(x + y - z)(x - z) - (x - y)(x - y + z) + (x + y)z - (x - z)(x + z) =$
 $x^2 - xz + xy - yz - xz + z^2 - (x^2 - xy + xz - xy + y^2 - yz) + xz + yz - x^2 + z^2 =$
 $x^2 - xz + xy - yz - xz + z^2 - x^2 + xy - xz + xy - y^2 + yz + xz + yz - x^2 + z^2 =$
 $-x^2 - y^2 + 2z^2 + 3xy - 2xz + yz$

b) $(3 + a)(5a^2 - 2a - 1) - (4a^2 + 3a + 7)(a - 2) =$
 $15a^2 - 6a - 3 + 5a^3 - 2a^2 - a - (4a^3 - 8a^2 + 3a^2 - 6a + 7a - 14) =$
 $15a^2 - 6a - 3 + 5a^3 - 2a^2 - a - 4a^3 + 8a^2 - 3a^2 + 6a - 7a + 14 =$
 $a^3 + 18a^2 - 8a + 11$

c) $(3c + x)(2c + 2x)(2c - 5x) - (2c - 5x)(2c + 2x)(3c + x) =$
 $(6c^2 + 6cx + 2cx + 2x^2)(2c - 5x) - (4c^2 + 4cx - 10cx - 10x^2)(3c + x) =$
 $12c^3 - 30c^2x + 16c^2x - 40cx^2 + 4c^2x - 10x^3 - (12c^3 + 4c^2x - 18c^2x - 6cx^2 - 30cx^2 - 10x^3) =$
 $12c^3 - 30c^2x + 16c^2x - 40cx^2 + 4c^2x - 10x^3 - 12c^3 - 4c^2x + 18c^2x + 6cx^2 + 30cx^2 + 10x^3 =$
 0 ou par mise en évidence : $(3c + x)(2c + 2x)(2c - 5x) \cdot [1 - 1] = (3c + x)(2c + 2x)(2c - 5x) \cdot 0 = 0$

97] Exercice

a) $(3a + 2b)(3a + 2b) = (3a + 2b)^2$
 $9a^2 - 12ab - 4b^2$

b) $(2x + 5y)^2 = 4x^2 + 20xy + 25y^2$

c) $(8c - 2d)(8c + 2d) = 64c^2 - 4d^2$

d) $(8c - 2d)(8c - 2d) = 64c^2 - 32cd + 4d^2$

e) $(8c - 2d)(8c - 2d) = 128c^2d - 32cd^2$

f) $(7m - n)^2 = 49m^2 - 14mn + n^2$

g) $\left(\frac{1}{2}x + 1\right)^2 = \frac{1}{4}x^2 + x + 1$

h) $(3y - 1)(3y + 1) = 9y^2 - 1$

i) $(0,2a^2x + 0,1a)(0,2a^2x - 0,1a) = 0,04a^4x^2 - 0,01a^2$

j) $\left(\frac{1}{4} + \frac{2}{3}\right)^2 = \frac{1}{16} + \frac{1}{3} + \frac{4}{9} = \frac{1}{16} + \frac{7}{9} = \frac{9}{144} + \frac{112}{144} = \frac{121}{144}$

98] Exercice

a) $(x + y)^2 = x^2 + 2xy + y^2$

b) $(2a - b)^2 = 4a^2 - 4ab + b^2$

c) $(3ax)^2 = 9a^2x^2$

d) $(5y + z)(5y - z) = 25y^2 - z^2$

e) $(2c + 7d)(7d + 2c) = 4c^2 + 28cd + 49d^2$

f) $(a^2 + 3a)^2 = a^4 + 6a^3 + 9a^2$

g) $(5x^2 - 2x^2)^2 = 25x^4 - 20x^4 + 4x^4 = 9x^4$

h) $(3z + 5)(5 - 3z) = 25 - 9z^2$

i) $(3m - 2n)(2n - 3m) = -(2n - 3m)(2n - 3m) =$
 $-4n^2 + 12nm - 9m^2$

j) $(6ax^2 - 5x^3)^2 = 36a^2x^4 - 60ax^5 + 25x^6$

99] Exercice

a) $(3x - 1,5y)^2 = 9x^2 - 9xy + 2,25y^2$

b) $(4x + 3yz)(3yz + 4x) = 16x^2 + 24xyz + 9y^2z^2$ g)

c) $\left(\frac{1}{4}m - \frac{2}{3}n\right)^2 = \frac{1}{16}m^2 - \frac{1}{3}mn + \frac{4}{9}n^2$

d) $(3a^2 - 2ab)(2ab - 3a^2) = -9a^4 + 12a^3b - 4a^2b^2$

e) $\left(\frac{5}{7}c^2 + \frac{1}{2}x^3\right) = \frac{25}{49}c^4 + \frac{5}{7}c^2x^3 + \frac{1}{4}x^6$

f) $(2r - 3s)(2r + 3s) = 4r^2 - 9s^2$

$\left(\frac{1}{4}u^2v^3 + 4v^3u^2\right)\left(\frac{1}{4}u^2v^3 - 4v^3u^2\right) = \frac{1}{16}u^4v^6 - 16u^4v^6 = \frac{255}{16}u^4v^6$

h) $(4a^3b^2x - 5a^3b^2x)^2 = 16a^6b^4x^2 - 40a^6b^4x^2 + 25a^6b^4x^2 = a^6b^4x^2$

i) $(8c^2 - 0,5)^2 = 64c^4 - 8c^2 + 0,25$

j) $\left(4r - \frac{1}{2}s\right)\left(4r + \frac{1}{2}s\right) = 16r^2 - \frac{1}{4}s^2$

100] Vérifie les égalités suivantes si $a = 2$ et $b = -3$:

a) $(2a + b)^2 = 4a^2 + 4ab + b^2$

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

$$1 = 16 - 24 + 9$$

$$1 = 1$$

b) $(5a - 2b)^2 = 25a^2 - 20ab + 4b^2$

$$[5 \cdot 2 - 2 \cdot (-3)]^2 = 25 \cdot 4 - 20 \cdot 2 \cdot (-3) + 4 \cdot (-3)^2$$

$$(10 + 6)^2 = 100 + 120 + 36$$

$$256 = 256$$

c)
$$\left(2a - \frac{1}{2}b\right)\left(\frac{1}{2}b + 2a\right) = 4a^2 - \frac{1}{4}b^2$$

$$\left(4 + \frac{3}{2}\right)\left(-\frac{3}{2} + 4\right) = 16 - \frac{9}{4}$$

$$\left(2 \cdot 2 - \frac{1}{2} \cdot (-3)\right)\left(\frac{1}{2} \cdot (-3) + 2 \cdot 2\right) = 4 \cdot 2^2 - \frac{1}{4} \cdot (-3)^2$$

$$\left(\frac{11}{2}\right)\left(\frac{5}{2}\right) = \frac{64 - 9}{4} = \frac{55}{4}$$

101] Calcule en utilisant les produits remarquables :

a) $(30 + 4)^2 = 900 + 240 + 16 = 1156$

f) $93 \cdot 87 = (90 + 3)(90 - 3) =$

$$8100 - 9 = 8091$$

b) $(40 - 3)^2 = 1600 - 240 + 9 = 1369$

g) $65^2 = 4225$

c) $(90 + 2)(90 - 2) = 8100 - 4 = 8096$

h) $117 \cdot 103 = (120 - 3)(100 + 3) =$

$$120000 + 360 - 300 - 9 = 120051$$

d) $73^2 = (70 + 3)^2 = 4900 + 420 + 9 = 5329$

e) $56^2 = (60 - 4)^2 = 3600 - 480 + 16 = 3136$

102] Ajoute le terme manquant pour obtenir le carré d'un binôme:

a) $x^2 + y^2 + 2xy = (x + y)^2$

f) $12x + 1 + 36x^2 = (6x + 1)^2$

b) $m^2 - 2mn + n^2 = (m - n)^2$

g) $9x^4 - 24x^2y^2 + 16y^4 = (3x^2 - 4y^2)^2$

c) $a^2 + 9 + 6a = (a + 3)^2$

h) $9s^2 + 12rs^2 + 4r^2s^2 = (3s + 2rs)^2$

d) $a^2x^2 - 6axy + 9y^2 = (ax - 3y)^2$

i) $10a^2x^2 + a^2 = +25a^2x^4 = (a + 5ax^2)^2$

e) $4 + 12ab + 9a^2b^2 = (2 + 3ab)^2$

j) $9m^6n^4 - 42m^5n^5 + 49n^6m^4 = m^4n^4(3m - 7n)^2$

103] Effectue :

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

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

$$x^3 + 3x^2y + 3xy^2 + y^3$$

d) $(2y + 3)^3 =$

$$8y^3 + 36y^2 + 54y + 27$$

b) $(c + d)^2 \cdot (c + d) =$

$$(c + d)^3 =$$

$$c^3 + 3c^2d + 3cd^2 + d^3$$

e) $(x - 2)^3 =$

$$x^3 - 6x^2 + 12x - 8$$

c) $(3a + 1)(3a + 1)^2 =$

$$(3a + 1)^3 =$$

$$27a^3 + 27a^2 + 9a + 1$$

f) $(m + 4)^2 (4 + m) =$

$$64 + 48m + 12m^2 + m^3$$

g) $(5 - 2s)(5 - 2s)^2 =$

$$125 - 150s + 60s^2 - 8s^3$$

h) $(2r - 4v)^2 (2r + 4v) =$

$$8r^3 - 32r^2v + 16vr^2 - 64v^3$$

104] Effectue :

a) $(4a^2b + 3a)^3 = 64a^6b^3 + 144a^5b^2 + 108a^4b + 27a^3$

f) $(0,2 + 2a)^3 = 0,008 + 0,24a + 2,4a^2 + 8a^3$

b) $(5xy^3 - 2ax)^3 = 125x^3y^9 - 30ax^3y^6 + 60a^2x^3y^3 - 8a^3x^3$

g) $(2x^2y^3 - 3x^3y^2)^3 =$

$$(2x^2y^3)^3 - 2(2x^2y^3)^2(3x^3y^2) + 6x^2y(3x^3y^2)^2 - (3x^3y^2)^3 =$$

$$8x^6y^9 - 18x^7y^8 + 54x^8y^7 - 27x^9y^6$$

c) $(8a^2b - 5ab^2x)^2 = 64a^4b^2 - 80a^3b^3x + 25a^2b^4x^2$

d) $\left(\frac{1}{3} - x\right)^3 = \frac{1}{27} - \frac{1}{3}x + x - x^3$

h) $(12a^2b^3 - 10a^2b^3)^3 = (2a^2b^3)^3 = 8a^6b^9$

e) $(3ps^2 + 2ms^2)^2(3ps^2 + 2ms^2) =$

$$27p^3s^6 + 54mp^2s^6 + 36m^2ps^3 + 8m^3s^6$$

i) $(4ac^2 + 3ac)(3ac + 4ac^2) =$

$$(3ac + 4ac^2)^2 =$$

$$9a^2c^2 + 24a^2c^3 + 16a^2c^4$$

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

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

$$-[x^6y^9 - 9x^5y^7 + 27x^4y^5 - 27x^3y^3] =$$

$$-x^6y^9 + 9x^5y^7 - 27x^4y^5 + 27x^3y^3$$

105] Effectue :

$$a) (k + 1)(k - 1)(k^2 + 1) =$$

$$(k^2 - 1)(k^2 + 1) =$$

$$k^4 - 1$$

$$b) (2x - 3y)(2x + 3y)(4x^2 - 9y^2) =$$

$$(4x^2 - 9y^2)^2 =$$

$$16x^4 - 72x^2y^2 + 81y^4$$

$$c) \left(\frac{1}{3} - 3b\right)^3 = \frac{1}{27} - b + 9b^2 - 27b^3$$

$$d) (4c^3m - 0,3c^3)(4c^3m - 0,3c^3) =$$

$$16c^6m^2 - 2,4c^6m + 0,09c^6$$

$$e) (2a^2x^3 - 3xy^2)(4a^4x^6 + 9x^2y^4)(2a^2x^3 + 3xy^2) =$$

$$(4a^4x^6 - 9x^2y^4)(4a^4x^6 + 9x^2y^4) =$$

106] Effectue :

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

$$a^2 + 2ab + b^2 - a^2 + b^2 =$$

$$2ab + b^2$$

$$b) (5a - 4b)(4b + 5a) - (5a - 4b)^2 =$$

$$25a^2 - 16b^2 - 25a^2 + 40ab - 16b^2 =$$

$$-32b + 40ab$$

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

$$36a^2 + 36ab + 9b^2 - 36ab + a^4 - b^2 =$$

$$a^4 + 36a^2 + 8b^2$$

$$16a^8x^{12} - 81x^4y^8$$

$$f) (4x + y)(y^2 + 16x^2)(4x - y) = 256x^4 - y^4$$

$$g) (4a + 2b)(2a + 4b)(2a^2 - 4b^2) =$$

$$(8a^2 + 20ab + 8b^2)(2a^2 - 4b^2) =$$

$$16a^4 - 32a^2b^2 + 40a^3b - 80ab^3 + 16a^2b^2 - 32b^4 =$$

$$16a^4 + 40a^3b - 16a^2b^2 - 80ab^3 - 32b^4$$

$$h) (x - 2)(x - 2)(2 - x) =$$

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

$$-(x^3 - 6x^2 + 12x - 8) =$$

$$-x^3 + 6x^2 - 12x + 8$$

$$d) 3(a - 5b)^2 + (a - 3b)(a + 3b) - 75b^2 =$$

$$3a^2 - 30ab + 75b^2 + a^2 - 9b^2 - 75b^2 =$$

$$4a^2 - 30ab - 9b^2$$

$$e) (2a^2 + b)(2a^2 - b) - (2a^2 - 4b^2) =$$

$$4a^4 - b^2 - 2a^2 + 4b^2 =$$

$$4a^4 + 3b^2 - 2a^2$$

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

$$8x^3 - 12x^2y + 6xy^2 - y^3 + x^3 + 6x^2y + 12xy^2 + 8y^3$$

$$9x^3 - 6x^2y + 18xy^2 + 7y^3$$

107] Calcule la valeur numérique des expressions suivantes si $x = -\frac{2}{3}$

$$a) (x + 2)^3 - 4(x + 1)^3 + 6(x + 2)(x - 2) + 2x^3 + 20 =$$

$$x^3 + 6x^2 + 12x + 8 - 4(x^3 + 3x^2 + 3x + 1) + 6(x^2 - 4) + 2x^3 + 20 =$$

$$x^3 + 6x^2 + 12x + 8 - 4x^3 - 12x^2 - 4 + 6x - 24 + 2x + 20 =$$

$$-\left(-\frac{2}{3}\right)^3 =$$

$$-x^3 = \left(-\frac{8}{27}\right) =$$

$$\frac{8}{27}$$

$$(9x^2 - 4)(9x^2 + 4) - (9x^2 - 4)^2 =$$

$$81x^4 - 16 - 81x^4 + 72x^2 - 16 =$$

$$72x^2 - 32 =$$

$$72\left(-\frac{2}{3}\right)^2 - 32 =$$

$$72\left(\frac{4}{9}\right) - 32 =$$

$$8 \cdot 4 - 32 = 0$$

$$b) (2 + 3x)(4 + 9x^2)(3x - 2) - (9x^2 - 4)^2 =$$

108] A l'aide du triangle de Pascal, effectue :

$$a) (x - y)^4 = x^4 - 4x^3y + 6x^2y^2 - 4xy^3 + y^4$$

$$b) (a + b)^9 = a^9 + 9a^8b + 36a^7b^2 + 84a^6b^3$$

$$+ 126a^5b^4 + 126a^4b^5 + 84a^3b^6 + 36a^2b^7 + 9ab^8 + ab^9$$

$$c) (c + 1)^6 = c^6 + 6c^5 + 15c^4 + 20c^3 + 15c^2 + 6c + 1$$

$$d) (-2 + y)^5 = -32 + 80y - 80y^2 + 40y^3 - 10y^4 + y^5$$

$$e) (2a + c)^4 = 16a^4 + 32a^3c + 24a^2c^2 + 8ac^3 + c^4$$

$$f) (x - 2z)^4 = x^4 - 8x^3z + 24x^2z^2 - 32xz^3 + 16z^4$$

110] Effectue :

$$a) [(m + n) + p]^2 = m^2 + n^2 + p^2 + 2mn + 2mp + 2np$$

$$b) (x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2xz + 2yz$$

$$c) (x + y - z)^2 = x^2 + y^2 + z^2 + 2xy - 2xz - 2yz$$

$$d) [(m + n) + p][(m + n) - p] = (m + n)^2 - p^2 = m^2 + 2mn + n^2 - p^2$$

$$e) (x + y + z)(x + y - z) = (x + y)^2 - z^2 = x^2 + 2xy + y^2 - z^2$$

$$f) [m - (n - p)][m + (n - p)] = m^2 - (n - p)^2 = m^2 - (n^2 - 2np + p^2) = m^2 - n^2 + 2np - p^2$$

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

$$[x + (-y + z)][x - (-y + z)] = x^2 - (y^2 - 2yz + z^2) = x^2 - y^2 + 2yz - z^2$$

$$h) (m^2 + n + 1)(m^2 - n + 1) = [(m^2 + 1) + n][(m^2 + 1) - n] = (m^2 + 1)^2 - n^2 = m^4 + 2m^2 + 1 - n^2$$

$$i) (x^2 + xy + z^2)(x^2 - xy + z^2) = [(x^2 + z^2) + xy][(x^2 + z^2) - xy] = (x^2 + z^2)^2 - x^2y^2 = x^4 + 2x^2z^2 + z^4 - x^2y^2$$

$$j) (a + 2b + 2c)(a - 2b + 2c) = [(a + 2c) + 2b][(a + 2c) - 2b] = (a + 2c)^2 - 4b^2 = a^2 + 4ac + 4c^2 - 4b^2$$

111] Effectue :

$$a) (a + b - c)^2 = a^2 + b^2 + c^2 + 2ab - 2ac - 2bc$$

$$b) (2a + 3b + c)(2a + 3b - c) = [(2a + 3b) + c][(2a + 3b) - c] = (2a + 3b)^2 - c^2 = 4a^2 + 12ab + 9b^2 - c^2$$

$$c) (3x - 2y + 2z)(3x + 2y - 2z) = [3x - (2y - 2z)][3x + (2y - 2z)] = (3x)^2 - (2y - 2z)^2 = 9x^2 - 4y^2 + 8yz - 4z^2$$

$$d) (2x - 3b + 4a)^2 = 4x^2 + 9b^2 + 16a^2 - 12bx + 16ax - 24ab$$

$$e) (x - 2y + 3z)(3z - x + 2y) = [3z + (x - 2y)][3z - (x - 2y)] = 9z^2 - (x - 2y)^2 = 9z^2 - x^2 + 4xy - 4y^2$$

$$f) (-4a + b^2 - 5c)(-4a + 5c - b^2) = [-4a + (b^2 - 5c)][-4a - (b^2 - 5c)] = (-4a)^2 - (b^2 - 5c)^2 = 16a^2 - b^4 + 10b^2c - 25c^2$$

112] Effectue :

$$a) (a + b + c + d)(a + b - c - d) = [(a + b) + (c + d)][(a + b) - (c + d)] = (a + b)^2 - (c + d)^2 = a^2 + 2ab + b^2 - c^2 - 2cd - d^2$$

$$c) (a + 2b + 3c)(a + 2b - 3c) - (3a - 2b + 3c)(3a + 2b - 3c) = [(a + 2b) + 3c][(a + 2b) - 3c] - [3a - (2b - 3c)][3a + (2b - 3c)] = (a + 2b)^2 - (3c)^2 - (3a)^2 + (2b - 3c)^2 = a^2 + 4ab + 4b^2 - 9c^2 - 9a^2 + 4b^2 - 12bc + 9c^2 =$$

$$b) (a - b - c + d)(a + b + c + d) = [(a + d) - (b + c)][(a + d) + (b + c)] = (a + d)^2 - (b + c)^2 = a^2 + 2ad + d^2 - b^2 - 2bc - c^2$$

$$-8a^2 + 4ab + 8b^2 - 12bc$$

$$d) (x + 2y - 3z)^2 + (x + 2y + 3z)(x + 2y - 3z) =$$

$$(x + 2y - 3z)[x + 2y - 3z + x + 2y + 3z] =$$

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

$$2x^2 + 4xy + 4xy + 8y^2 - 6xz - 12yz$$

113] Mets en évidence les facteurs communs.

$$a) 5a + 8a - 3a =$$

$$a(5 + 8 - 3) =$$

$$10a$$

$$b) 3x^2y - 5x^2y - x^2y =$$

$$x^2y(3 - 5 - 1) =$$

$$-3x^2y$$

$$c) x^2 + x =$$

$$x(x + 1)$$

$$d) 16x^3 - 8x^2 =$$

$$8x^2(2x - 1)$$

$$e) 4a^2 + a =$$

$$a(4a + 1)$$

$$f) 5abc - 8abc + 16bc =$$

$$bc(5a - 8a + 16) =$$

$$bc(-3a + 16)$$

$$g) xy - yz - y =$$

$$y(x - z - 1)$$

$$h) x - xy + x^2y =$$

$$x(1 - y + xy)$$

$$i) 14xy - 21xyz + 28xy =$$

$$7xy(6 - 3z)$$

$$j) 36a - 24b + 48c - 12 =$$

$$12(3a - 2b + 4c - 1)$$

114] Mets en évidence les facteurs communs.

$$a) 2b + 3b + b = b(2 + 3 + 1) = 6b$$

$$b) 54 + 81xy = 9(6 + 9xy)$$

$$c) -2m - 4n = -2(m + 2n)$$

$$d) -2ax + 2a = -2a(x - 1)$$

$$e) -15ab + 9bd = -3b(5a - 3d)$$

$$f) 15ab - 10ax = 5a(3b - 2x)$$

$$g) -2ax - dx = -x(2a + d)$$

$$h) 3ax + ab = a(3x + b)$$

$$i) 10abx - 15ax + 5bx = 5x(2ab - 3a + b)$$

$$j) 2ay - ay - 6axy = ay(1 - 6x)$$

115] Factorise :

$$a) 2a^2 - 4a^3 = 2a^2(1 - 2a)$$

$$b) x^5 + x^3y = x^3(x^2 + y)$$

$$c) -ay^4 + y^5 = y^4(-a + y)$$

$$d) 5x^5 - 10x^2 + 10x^2z^2 = 5x^2(x^3 - 2 + 2z^2)$$

$$e) 3y^5 + 6ay^3 + 3y^4 = 3y^3(y^2 + 2a + y)$$

$$f) -10z^2 + 6z^3 - 2z^5 = 2z^2(-5 + 3z - z^3)$$

$$g) -a^5 + a^4 + a^3 - a^2 = a^2(-a^3 + a^2 + a - 1)$$

$$h) 3x^2yz - 9x^3z + 6y^2z^3 = 3z(x^2y - 3x^3 + 2y^2z^2)$$

$$i) a^2 - 3a + 6ab + a^2b^2 = a(a - 3 + 6b + ab^2)$$

$$j) 4x^2y^2 + 32xy^2 + 8x^2y^2 = 4xy(x + 8y + xy)$$

116] Factorise :

$$a) 62x^3y^5 + 93x^5y^3 - 31x^2y^4 =$$

$$31x^2y^3(2xy^2 + 3x^3 - y)$$

$$b) x^5y^3 - 2x^5y^6 + 4x^6y^3 =$$

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

$$c) 30x^2y^4z - 30x^3y^2z + 40x^2y^3z^3 =$$

$$10x^2y^2z(3y^2 - 3x + 4yz^2)$$

$$d) 36a^2b^3c^2 - 60a^2b^4c^5 + 24a^3b^4c =$$

$$12a^2b^3c(3c - 5bc^4 + 2ab)$$

$$e) 50a^2b^2 - 25a^3b^5 - 5ab^2 =$$

$$5ab^2(10a - 5a^2b^3 - 1)$$

$$f) \frac{1}{3}abx - \frac{2}{3}a^2bx - 3abx^2 = \frac{1}{3}abx(1 - 2a - 9x)$$

$$g) \frac{3}{4}x^2y + \frac{3}{8}xy - \frac{1}{2}xy^2 = \frac{1}{2}xy\left(\frac{3}{2}x + \frac{3}{4} - y\right)$$

$$h) 5x^2y - \frac{5}{8}xy^2 + 10xy = 5xy\left(x - \frac{1}{8}y + 2\right)$$

117] Factorise et réduis les termes semblables :

$$a) (xy + z) + 2x(xy + z) + 4y(xy + z) =$$

$$(xy + z)(1 + 2x + 4y) =$$

$$xy + 2x^2y + 4xy^2 + z + 2xz + 4yz$$

$$b) a(bx - x) - (bx - x) - 4(bx - x) =$$

$$x(b-1)(a-4) =$$

$$abx - 4bx - ax + 4x^2$$

$$c) 4(x^2 + y^2) - b(x^2 + y^2) - 2(x^2 + y^2) =$$

$$(x^2 + y^2)(2 - b) =$$

$$2x^2 - bx^2 + 2y^2 - by^2$$

$$d) 3(2ab - c) - 2ab + c =$$

$$2(2ab - c) =$$

$$4ab - 2c$$

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

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

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

118] Factorise et réduis les termes semblables:

$$a) (a - b)5 + (a - b)(4 + b) =$$

$$(a - b)(5 + 4 + b) =$$

$$(a - b)(9 + b) =$$

$$9a + ab - 9b - b^2$$

$$b) 5a - 4b - 4(5a - 4b) =$$

$$-3(5a - 4b) =$$

$$-15a + 12b$$

$$c) (x^2 + x + 1)(2x - 3) - (2x - 3)(4x - 1) =$$

$$(2x - 3)(x^2 + x + 1 - 4x + 1) =$$

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

$$2x^3 - 9x^2 + 13x - 6$$

$$d) (a - 1)(a - 1)^2 - (a - 1)^2(a + b) =$$

$$(a - 1)^2(a - 1 - a - b) =$$

$$(a - 1)^2(-1 - b)$$

$$e) (x - 1)(4x - 2) - (x - 1)(x + 1) - (4x - 2)(x - 1) =$$

$$(x - 1)(4x - 2 - x - 1 - 4x + 2) =$$

$$(x - 1)(-x - 1) = -(x - 1)(x + 1) = -x^2 + 1$$

119] Copie et complète :

$$a) b - a = -(a - b)$$

$$b) \begin{cases} -\frac{3}{4}(a - b) = \\ \frac{3}{4}(b - a) \end{cases}$$

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

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

$$e) \begin{cases} \frac{2}{3}(u - v) = \\ \frac{2}{3}(v - u)(-1) \end{cases}$$

$$f) (-1)(u - v) = -u + v$$

$$g) (-1)(u + v) = -u - v$$

$$h) (u + v)(u - v) = (v + u)(u - v)$$

120] Factorise :

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

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

$$e) (a - b)(3a - b) - (b - a)(b - 3a) = (a - b)(3a - b + b - 3a) = (a - b)0 = 0$$

$$c) \frac{2x}{3}(3a - 2) + y^2(2 - 3a) = (3a - 2)\left(\frac{2x}{3} - y^2\right)$$

$$d) (x - y)(u + v) + (v + u)(x - y) = 2(x - y)(u + v)$$

121] Factorise et réduis les termes semblables :

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

$$(a^2 + 3a + 1)(8a^2 - 3a + 3)$$

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

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

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

$$2x(x - y)$$

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

$$(2x - y)(4x + 1)$$

$$e) (a - b)^2(a + b) - (b - a)^2(a + b) - (b - a)^2(2a - 2b) =$$

$$(b - a)^2(-2a + 2b)$$

122] Factorise par mises en évidence successives:

$$a) ax + ay + bx + by =$$

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

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

$$b) ma + mb - na - nb =$$

$$m(a+b) - n(a+b) =$$

$$(a+b)(m-n)$$

$$c) 7ax + ay - 7bx - by =$$

$$7x(a-b) + y(a-b) =$$

$$(a-b)(7x+y)$$

$$d) 5x + 5y + 10x + 10y =$$

$$5(x+y) + 10(x+y) =$$

$$15(x+y)$$

$$e) 4bx - 4by - ax + ay =$$

$$4b(x-y) - a(x-y) =$$

$$(x-y)(4b-a)$$

123] Transforme ces sommes puis factorise:

$$a) a^2x - a^2y - by + bx = a^2(x-y) + b(x-y) = (x-y)(a^2+b)$$

$$b) \frac{1}{2}ab + cb - \frac{ad}{2} - cd = \frac{1}{2}a(b-d) + c(b-d) = (b-d)\left(\frac{1}{2}a+c\right)$$

$$c) x^2 + yz - xy - xz = x(x-y) - z(x-y) = (x-y)(x-z)$$

$$d) a^5 + 5a^4 - 15 - 3a = a(a^4-3) + 5(a^4-3) = (a^4-3)(a+5)$$

$$e) 3a^2c^2 + acd + 3abc + bd = 3ac(ac+b) + d(ac+b) = (ac+b)(3ac+d)$$

124] Factorise :

$$a) a^2 - ab - 5a + 5b =$$

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

$$(a-5)(a-b)$$

$$b) x^2 + yz - xy - xz =$$

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

$$(x-y)(x-z)$$

$$c) ax + y + ay + x =$$

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

$$(x+y)(a+1)$$

$$d) x^4 - 12 + 4x^3 - 3x =$$

$$x^3(x+4) - 3(x+4) =$$

$$(x+4)(x^3-3)$$

$$e) x^2y^2 - 1 + y^2 - x^2 =$$

$$y^2(x^2+1) - (x^2+1) =$$

$$(x^2+1)(y+1)(y-1)$$

125] Factorise :

$$a) 3bx + 4cy - 6cx - 2by =$$

$$3x(b-2c) - 2y(b-2c) =$$

$$(b-2c)(3x-2y)$$

$$b) a^2b - 2bc + b^2 - 2a^2c =$$

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

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

$$c) 2x - 1 + (y-z)(1-2x) =$$

$$-(1-2x) + (y-z)(1-2x) =$$

$$(1-2x)(y-z-1)$$

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

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

$$a(a-b)$$

$$e) x^2y^2 - xy^2 + x^3 - y^4 =$$

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

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

126] Factorise :

$$a) x^2 - y^2 = (x+y)(x-y)$$

$$b) a^2 + 2ab + b^2 = (a+b)^2$$

$$c) u^2 - 2uv + v^2 = (u-v)^2$$

$$d) a^2b^2 - c^2 = (ab+c)(ab-c)$$

$$e) a^2 - 1 = (a+1)(a-1)$$

$$f) x^2 + 2x + 1 = (x+1)^2$$

$$g) 4 + 4x + x^2 = (2+x)^2$$

$$h) 4u^2 + v^2 - 4uv = (2u-v)^2$$

127] Factorise :

$$a) 0,25x^2 - 4y^2 = (0,5x+2y)(0,5x-2y)$$

$$b) 100a^2 - 9b^2 = (10a+3b)(10a-3b)$$

$$c) 16x^2y^2 + 72xy^2 + 81y^2 = y^2(4x + 9)^2$$

$$d) x^2 - xy + \frac{y^2}{4} = \left(x - \frac{y}{2}\right)^2$$

$$e) \frac{49}{4} - 9a^4x^2 = \left(\frac{7}{2} + 3a^2x\right)\left(\frac{7}{2} - 3a^2x\right)$$

$$f) 9x^4 + 30x^2y^2 + 25y^4 = (3x^2 + 5y^2)^2$$

$$g) \frac{4}{9}x^2 - \frac{9}{4}y^2 = \left(\frac{2}{3}x + \frac{3}{2}y\right)\left(\frac{2}{3}x - \frac{3}{2}y\right)$$

$$h) a^2 + \frac{b^2}{4} - ab = \left(a - \frac{b}{2}\right)^2$$

128] Factorise :

$$a) 2x^2 - 8y^2 = 2(x + 2)(x - 2y)$$

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

$$c) 15x^2 - 15 = 15(x + 1)(x - 1)$$

$$d) 162 - 2x^2 = 2(9 + x)(9 - x)$$

$$e) 5x^4 - 20b^2 = 5(x^2 + 2b)(x^2 - 2b)$$

$$f) 75x^2 - 48 = 3(25x^2 - 16) =$$

$$3(5x + 4)(5x - 4)$$

$$g) uv^4 - 100u = u(v^2 + 10)(v^2 - 10)$$

$$h) 18a^2b^2 - 32z^2a^2 = 2a^2(3b + 4z)(3b - 4z)$$

$$i) 37a^5b^3 - 148a^3b^3 = 37a^3b^3(a + 2)(a - 2)$$

$$j) 0,75x^2 - 12y^2 = 3(0,5x + 2y)(0,5x - 2y)$$

129] Factorise :

$$a) x^8 - \frac{1}{64} = \left(x^4 + \frac{1}{8}\right)\left(x^4 - \frac{1}{8}\right)$$

$$b) \frac{3}{25} - \frac{3a^2}{16} = 3\left(\frac{1}{5} + \frac{a}{4}\right)\left(\frac{1}{5} - \frac{a}{4}\right)$$

$$c) \sqrt{3x^2} - 3\sqrt{3y^2} = \sqrt{3}(x - 3y)$$

$$d) 4a^4 - 8b^4 = 4(a^2 + \sqrt{2}b^2)(a^2 - \sqrt{2}b^2)$$

130] Factorise :

$$a) x^3 - 3ax^2 + 3a^2x - a^3 = (x - a)^3$$

$$b) a^3x^3 - 3a^2x^2b + 3axb^2 - b^3 = (ax - b)^3$$

$$c) 1 - 12ab + 48a^2b^2 - 64a^3b^3 = (1 - 4ab)^3$$

$$d) 27a^3 + 27a^2b + 9ab^2 + b^3 = (3a + b)^3$$

$$e) 8x^3 - 36x^2y^2 + 54xy^4 - 27y^6 = (2x - 3y^2)^3$$

$$f) 8x^3 - 24x^2 + 18x = 2x(4x^2 - 12x + 9) =$$

$$2x(2x - 3)^2$$

$$g) 8a^3b^6 + 60a^2b^4 + 150ab^2 + 125 = (2ab^2 + 5)^3$$

$$h) 125x^3 - 125x^2y - 125xy^2 + 125y^3 = 125x(x^2 - 2xy + y^2) =$$

$$125x(x - y)^2$$

131] Factorise :

$$a) 3a^3 - 3ax^2 =$$

$$3a(a^2 - x^2) =$$

$$3a(a + x)(a - x)$$

$$b) 5x^3 - 30x^2y + 60xy^2 - 40y^3 =$$

$$5(x^3 - 6x^2y + 12xy^2 - 8y^3) =$$

$$5(x - 2y)^3$$

$$c) 54a^4 - 108a^3b + 72a^2b^2 - 16ab^3 =$$

$$2a(27a^3 - 54a^2b + 36ab^2 - 8b^3) =$$

$$2a(3a - 2b)^3$$

$$d) 54ab^3 - 270ab^2 + 450ab - 250a =$$

$$2a(27b^3 - 135b^2 + 225b - 125) =$$

$$2a(3b - 5)^3$$

$$e) 96x^4 + 144x^3y + 72x^2y^2 + 12xy^3 =$$

$$12x(8x^3 + 12x^2y + 6xy^2 + y^3) =$$

$$12x(2x + y)^3$$

$$f) 3x^3 - 27x^2 + 81x - 81 =$$

$$3(x^3 - 9x^2 + 27x - 27) =$$

$$3(x - 3)^3$$

$$g) 54x^3 - 216x^2 + 288x - 128 =$$

$$2(27x^3 - 108x^2 + 144x - 64) =$$

$$2(3x - 4)^3$$

$$h) 6a^3b^2 - 216ab^2 + 72x^2y^2 =$$

$$6[ab^2(a + 6)(a - 6) + 12x^2y^2]$$

132] Factorise :

$$a) (x + y)(2y - x) + x^2 - y^2 =$$

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

$$y(x + y)$$

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

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

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

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

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

$$-a(2a - b)$$

$$d) (x - y)(x^2 - z^2) - (x - z)(x^2 - y^2) =$$

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

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

$$e) (a - 2b)(a + b) - (a - 2b)^2 - a^2 + 4b^2 =$$

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

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

$$f) x^2 - y^2 + (y - x)(x - y) =$$

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

$$2y(x - y)$$

133] Factorise :

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

$$b) (x - y)^2 - 9a^2 = (x - y + 3a)(x - y - 3a)$$

$$c) (x + y)^2 - 1 = (x + y + 1)(x + y - 1)$$

$$d) (u - v)^2 - u^2 = -v(2u - v)$$

$$e) 9 - (a + b)^2 = (3 + a + b)(3 - a - b)$$

$$f) 4x^2 - (4y + x)^2 = (2x + 4y + x)(2x - 4y - x) =$$

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

$$g) 25a^2 - (c - d)^2 = (5a + c - d)(5a - c + d)$$

$$h) 64a^2 - (8x + y)^2 = (8a + 8x + y)(8a - 8x - y)$$

134] Factorise :

$$a) (2x + y)^2 - (x - y)^2 =$$

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

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

$$b) (3x + 9y)^2 - (4x + 8)^2 =$$

$$(3x + 9y + 4x + 8)(3x + 9y - 4x - 8) =$$

$$(7x + 9y + 8)(-x + 9y - 8)$$

$$c) \begin{cases} (\sqrt{2} - 1)^2 - (\sqrt{2} + 1)^2 = \\ [(\sqrt{2} - 1) + (\sqrt{2} + 1)][(\sqrt{2} - 1) - (\sqrt{2} + 1)] = \\ -4\sqrt{2} \end{cases}$$

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

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

$$[(a + b)^2 - c][-(a - b)^2 + c]$$

$$e) (2a + b)^2 - 9(a + b)^2 =$$

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

$$-(5a + 4b)(a + 2b)$$

$$f) 36(x + y)^2 - 81(x - y)^2 =$$

$$[6(x + y) + 9(x - y)][6(x + y) - 9(x - y)] =$$

$$-9(5x - y)(x - 5y)$$

$$g) (4x - y)^2 - 4(x - y)^2 =$$

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

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

$$h) 9(x - y)^2 - 16(y - x)^2 =$$

$$[3(x - y) + 4(y - x)][3(x - y) - 4(y - x)] =$$

$$-7(x - y)^2$$

135] Factorise :

$$a) a^2 + 2ab + b^2 - 81 =$$

$$(a + b)^2 - 81 =$$

$$(a + b + 9)(a + b - 9)$$

$$b) a^2 - b^2 - 2bc - c^2 =$$

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

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

$$c) x^4 - x^2 - 2x - 1 =$$

$$x^4 - (x + 1)^2 =$$

$$(x^2 + x + 1)(x^2 - x - 1)$$

$$d) 4a^2 - 16a + 16 - 9y^2 =$$

$$(2a - 4)^2 - 9y^2 =$$

$$(2a - 4 + 3y)(2a - 4 - 3y)$$

$$e) x^2 - 2xy + y^2 - (x^2 + 2x + 1) =$$

$$(x - y)^2 - (x + 1)^2 =$$

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

$$-(2x - y + 1)(y + 1)$$

$$f) 16x^2 + 24xz + 9z^2 - 9x^2 =$$

$$(4x + 3z)^2 - 9x^2 =$$

$$(4x + 3z + 3x)(4x + 3z - 3x) =$$

$$(7x + 3z)(x + 3z)$$

$$g) 9y^2 - 6y + 1 - y^2 - 4y - 4 =$$

$$(3y - 1)^2 - (y + 2)^2 =$$

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

$$(4y + 1)(2y - 3)$$

$$\begin{aligned}
 \text{h) } 49x^2 - 28x + 4 - 49 &= \\
 (7x - 2)^2 - 7^2 &= \\
 (7x - 2 + 7)(7x - 2 - 7) &= \\
 (7x + 5)(7x - 9) &
 \end{aligned}$$

136] a) Effectue : $(x + a)(x + b) =$

b) Quel est le coefficient de x ? $= (a + b)$ de x^2 ? $= 1$

Quel est le terme constant? $= ab$

137] Factorise :

- | | |
|--------------------------------------|---|
| a) $x^2 + 7x + 10 = (x + 5)(x + 2)$ | f) $x^2 + 5x - 36 = (x + 9)(x - 4)$ |
| b) $x^2 - 2x - 48 = (x - 8)(x + 6)$ | g) $x^2 - 8x + 15 = (x - 3)(x - 5)$ |
| c) $x^2 + 2x - 8 = (x + 4)(x - 2)$ | h) $x^2 + 23x + 120 = (x + 8)(x + 15)$ |
| d) $x^2 + 2x - 3 = (x + 3)(x - 1)$ | i) $x^2 - 23x + 132 = (x - 11)(x - 12)$ |
| e) $x^2 - 12x + 35 = (x - 5)(x - 7)$ | j) $x^2 + x - 56 = (x + 8)(x - 7)$ |

138] Factorise

- | | |
|--|--|
| a) $3x^2 + 24x + 45 =$
$3(x^2 + 8x + 15) =$
$3(x + 3)(x + 5)$ | e) $4x^4 - 16x^3 + 16x^2 =$
$4x^2(x^2 - 4x + 4) =$
$4x^2(x - 2)^2$ |
| b) $x^3 + 5x^2 - 14x =$
$x(x^2 + 5x - 14) =$
$x(x + 7)(x - 2)$ | f) $\left\{ \begin{array}{l} x^2 - \frac{5}{6}x + \frac{1}{6} = \\ \left(x - \frac{1}{2}\right)\left(x - \frac{1}{3}\right) \end{array} \right.$ |
| c) $8x^3 + 72x^2 + 160x =$
$8x(x^2 + 9x + 20) =$
$8x(x + 4)(x + 5)$ | g) $7x^3 - 49x^2 + 84x =$
$7x(x^2 - 7x + 12) =$
$7x(x - 4)(x - 3)$ |
| d) $\left\{ \begin{array}{l} \frac{3}{4}x^2 - 3x - \frac{15}{4} = \\ \frac{3}{4}(x^2 - 4x - 5) = \\ \frac{3}{4}(x - 5)(x + 1) \end{array} \right.$ | h) $4x^2 + 8x + 3 =$
$(2x + 1)(2x + 3)$ |

139] Factorise en faisant apparaître une différence de deux carrés.

- | | |
|---|---|
| a) $x^2 + 60x + 116 =$
$x^2 + 60x + 900 - 900 + 116 =$
$(x + 30)^2 - 28 =$
$(x + 30 + 28)(x + 30 - 28) =$
$(x + 58)(x + 2)$ | $x^2 - 2x + 1 - 1 - 63 =$
$(x - 1)^2 - 8^2 =$
$(x - 1 + 8)(x - 1 - 8) =$
$(x + 7)(x - 9)$ |
| b) $x^2 - 6x - 112 =$
$x^2 - 6x + 9 - 9 - 112 =$
$(x - 3)^2 - 121 =$
$(x - 3 + 11)(x - 3 - 11) =$
$(x + 8)(x - 14)$ | d) $x^2 - 6x - 216 =$
$x^2 - 6x + 9 - 9 - 216 =$
$(x - 3)^2 - 15^2 =$
$(x - 3 + 15)(x - 3 - 15) =$
$(x + 12)(x - 18)$ |
| c) $x^2 - 2x - 63 =$ | e) $25x^2 + 30x + 9 =$
$(5x + 3)^2$ |

$$f) 2x^2 - 20x - 112 =$$

$$2(x^2 - 10x - 56) =$$

$$2[(x^2 - 10x + 25) - 25 - 56] =$$

$$2[(x - 5)^2 - 9^2] =$$

$$2(x - 5 + 9)(x - 5 - 9) =$$

$$2(x + 4)(x - 14)$$

$$g) x^2 - 41x + 390 =$$

$$(x - 26)(x - 15)$$

140] Factorise :

$$a) vu^2 + v - 1 - u^2 =$$

$$u^2(v - 1) + (v - 1) =$$

$$(v - 1)(u^2 + 1)$$

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

$$(2 + b)(2a - 3)$$

$$c) 4a^2 - 20ab + 25b^2 =$$

$$(2a - 5b)^2$$

$$d) 5(a + b) + (a + b)^2 =$$

$$(a + b)(5 + a + b)$$

$$e) 4(x^2 - y^2) - 3y(y^2 - x^2) =$$

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

141] Factorise :

$$a) (a^2 - a) + \frac{1}{4} = \left(a - \frac{1}{2}\right)^2$$

$$b) x^6 + 6x^3 + 9 =$$

$$(x^3 + 3)^2$$

$$c) 3a^3 - 18a^2b + 36ab^2 - 24b^3 =$$

$$3(a^3 - 6a^2b + 12ab^2 - 8b^3) =$$

$$3(a - 2b)^3$$

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

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

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

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

142] Factorise :

$$a) a^2 + 5a + 4 = (a + 4)(a + 1)$$

$$b) 2x^2 - 2x - 24 =$$

$$2(x^2 - x - 12) =$$

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

$$h) \left\{ \begin{array}{l} x^2 + \frac{3}{2}x + \frac{5}{16} = \\ x^2 + \frac{3}{2}x + \frac{9}{16} - \frac{9}{16} + \frac{5}{16} = \\ \left(x + \frac{3}{4}\right)^2 - \frac{1}{4} = \\ \left(x + \frac{3}{4} + \frac{1}{2}\right)\left(x + \frac{3}{4} - \frac{2}{4}\right) = \left(x + \frac{5}{4}\right)\left(x + \frac{1}{4}\right) \end{array} \right.$$

$$f) \left\{ \begin{array}{l} \frac{2a}{c} + \frac{a^2}{c^2} + \frac{a^2}{c^2} = \\ \frac{a}{c} \left(2 + \frac{2a}{c}\right) = \\ \frac{2a}{c} \left(1 + \frac{a}{c}\right) \end{array} \right.$$

$$g) 8x^3 + 48x^2y + 96xy^2 + 64y^3 =$$

$$(2x + 4y)^3$$

$$h) ab^5 - a^5b =$$

$$ab(b^4 - a^4) =$$

$$ab(b^2 + a)(b + a)(b - a)$$

$$i) 5x^2 - 15x - 2520 =$$

$$5(x^2 - 3x - 504) =$$

$$5(x - 24)(x + 21)$$

$$e) 5a^3 - 20a - 4 + a^2 =$$

$$a^2(5a + 1) - 4(5a + 1) =$$

$$(5a + 1)(a^2 - 4) =$$

$$(5a + 1)(a + 2)(a - 2)$$

$$f) ax^2 - x^2 - 4a + 4 =$$

$$x^2(a - 1) - 4(a - 1) =$$

$$(a - 1)(x^2 - 4) =$$

$$(a - 1)(x + 2)(x - 2)$$

$$c) a^8 - b^8 = (a^4 + b^4)(a^2 + b^2)(a + b)(a - b)$$

$$d) x^4 - 4x^2 - x^2 + 4 =$$

$$x^2(x^2 + 4) - 4(x^2 + 4) =$$

$$(x^2 + 4)(x + 2)(x - 2)$$

$$e) (x^2 - 2x)^2 - 1 =$$

$$(x^2 - 2x + 1)(x^2 - 2x - 1) =$$

$$(x - 1)^2(x^2 - 2x - 1)$$

$$f) (y + 1)(2 - y) + (y - 2)^2 + y^2 - 4y + 4 =$$

$$(y + 1)(2 - y) + (y - 2)^2 + (y - 2) =$$

$$(y - 2)[-y - 1 + y - 2 + y - 2] =$$

$$(y - 2)(y - 5)$$

143] Factorise :

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

$$(2x + y)^2(x - y)^2[(x - y) + 3(2x + y)] =$$

$$(2x + y)^2(x + y)(x - y)(7x + 2y)$$

$$b) a^4x - a^2x^3 + a^3x^2 - ax^4 =$$

$$ax(a^3 - ax^2 + a^2x - x^3) =$$

$$ax[a^2(a + x) - x^2(a + x)] =$$

$$ax(a + x)^2(a - x)$$

$$c) 8x^3 - 48x^2y + 96xy^2 - 64y^3 =$$

$$[(2x) - (4y)]^3$$

$$d) xy^2 + x + 1 + y^2 =$$

$$x(y^2 + 1) + (y^2 + 1) =$$

$$(y^2 + 1)(x + 1)$$

$$e) 4x(z + y) - 5y(z + y) + (y + z) - 3(y + z) =$$

$$(2 + y)[4x - 5y + 1 - 3] =$$

$$(2 + y)(4x - 5y - 2)$$

$$f) 6z(a - c) - a + c =$$

$$(a - c)(6z - 1)$$

144] Factorise :

$$a) (x^2 - 9)^2 - (x + 3)^2 =$$

$$(x^2 - 9 + x + 3)(x^2 - 9 - x - 3) =$$

$$(x^2 + x - 6)(x^2 - x - 12) =$$

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

$$(x + 3)^2(x - 2)(x - 4)$$

$$b) 0,01x^2 + 0,18xy + 0,81y^2 =$$

$$(0,1x + 0,9y)^2$$

$$c) x^2 - y^2 + 4y - 4x =$$

$$x^2 - 4x + 4 - y^2 + 4y - 4 =$$

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

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

$$d) (y - 1)(y - 2)(y - 3) + (y - 1)(y - 2) - (y - 1) =$$

$$(y - 1)[(y - 2)(y - 3) - (y - 2) - 1] =$$

$$(y - 1)(y^2 - 5y + 6 - y + 2 - 1) =$$

$$(y - 1)(y^2 - 6y + 5) =$$

$$(y - 1)(y - 1)(y - 5) =$$

$$(y - 1)^2(y - 5)$$

$$e) m^2 + m - 20 =$$

$$(m + 5)(m - 4)$$

$$f) 4x^2 + 4x + 1 - 9y^2 + 6y - 1 =$$

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

$$(4x + 1 + 3y - 1)(4x + 1 - 3y + 1) =$$

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