

Exercices développement

vendredi, 3 novembre 2023 10:44



Exercices
développ...

Effectuer et réduire les polynômes

Effectuer, réduire et ordonner les polynômes suivants.

a) $v^2 + (w^2 - (x^2 + y^2))$
 $= \boxed{v^2 + w^2 - x^2 - y^2}$

b) $-(2x - (3x + 1) + 2x) - (b + 11)$
 $= -(2x - 3x - 1 + 2x) - b - 11$
 $= -2x + 3x + 1 - 2x - b - 11$
 $= \boxed{-x - b - 10}$

c) $12a^3 - (6a - (10a^3 - 3a + 2) - 10a)$
 $= 12a^3 - (6a - 10a^3 + 3a - 2 - 10a)$
 $= 12a^3 - 6a + 10a^3 - 3a + 2 + 10a$
 $= \boxed{22a^3 + a + 2}$

d) $\left(\left(\left((a^2 + a + 1)a - a^2 \right) a - a^4 \right) a - a^3 \right) + 1$
 $= \left(\left(\left(a^3 + a^2 + a - a^2 \right) a - a^4 \right) a - a^3 \right) + 1$
 $= \left(\left(a^4 + a^2 - a^4 \right) a - a^3 \right) + 1$
 $= (a^3 - a^3) + 1 = \boxed{1}$

e) $(2 + y^6)(2 - y^6)$
 $4 - 2y^6 + 2y^6 - y^{12}$
 $= \boxed{4 - y^{12}}$

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

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

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

$$= \boxed{4x^4 - 4x^2y + y^2}$$

$$g) (x - 3)(x + 7)$$

$$x^2 - 3x + 7x - 21$$

$$= \boxed{x^2 + 4x - 21}$$

$$h) (4a - 2b)^2$$

$$= \boxed{16a^2 - 16ab + 4b^2}$$

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

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

$$= 81x^4 - \cancel{108x^3y} + 36x^2y^2 + \cancel{108x^3y} - \cancel{144x^2y^2} + 48xy^3 + \cancel{36x^2y^2} - \cancel{48xy^3} + 16y^4$$

$$= \boxed{81x^4 - 72x^2y^2 + 16y^4}$$

$$j) (2 - b)^5 = (2 - b)(2 - b)(2 - b)(2 - b)(2 - b)$$

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

$$= (16 - 16b + 4b^2 - 16b + 16b^2 - 4b^3 + 4b^2 - 4b^3 + b^4) \cdot (2 - b)$$

$$= (16 - 32b + 24b^2 - 8b^3 + b^4) \cdot (2 - b)$$

$$= 32 - 64b + 48b^2 - 16b^3 + 2b^4 - 16b + 32b^2 - 24b^3 + 8b^4 - b^5 = \boxed{32 - 80b + 80b^2 - 40b^3 + 10b^4 - b^5}$$

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

$$\boxed{9x^2 - 30xy + 25y^2}$$

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

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

$$= 16x^4 - 16x^3 + 4x^2 - 16x^3 + 16x^2 - 4x + 4x^2 - 4x + 1$$

$$= \boxed{16x^4 - 32x^3 + 24x^2 - 8x + 1}$$

$$\begin{aligned}
 \text{m)} \quad & 4a^2 - 5(a(2a - 9) - 3(a + 7)) + 6(a - 12)(a + 1) \\
 &= 4a^2 - 5(2a^2 - 9a - 3a - 21) + (6a - 72)(a + 1) \\
 &= 4a^2 - 10a^2 + 45a + 105 + 6a^2 + 6a - 72a - 72 \\
 &= \boxed{-6a + 33}
 \end{aligned}$$

$$\begin{aligned}
 \text{n)} \quad & (2x + 10)^2(2x - 10)^2 = (2x + 10) \cdot (2x + 10) \cdot (2x - 10) \cdot (2x - 10) \\
 &= \underbrace{(2x + 10)(2x - 10)}_{4x^2 - 100} \cdot \underbrace{(2x + 10)(2x - 10)}_{4x^2 - 100}
 \end{aligned}$$

$$(4x^2 - 100)^2 = \boxed{16x^4 - 800x^2 + 10000}$$

$$\begin{aligned}
 \text{o)} \quad & 2 - n(3n - 1)(n - 6) \\
 &= 2 - (3n^2 - n)(n - 6) \\
 &= 2 - (3n^3 - 18n^2 - n^2 + 6n) \\
 &= 2 - 3n^3 + 19n^2 - 6n = \boxed{-3n^3 + 19n^2 - 6n + 2}
 \end{aligned}$$

$$\begin{aligned}
 \text{p)} \quad & 5p(p - 3) - (2p + 1)(p - 8) \\
 &= 5p^2 - 15p - (2p^2 - 16p + p - 8) \\
 &= 5p^2 - 15p - 2p^2 + 16p - p + 8 \\
 &= \boxed{3p^2 + 8}
 \end{aligned}$$

$$\begin{aligned}
 \text{q)} \quad & 17x^2 - (4x - 2)(8x - 5) + (3x - 4)(5x + 6) \\
 &= 17x^2 - (32x^2 - 20x - 16x + 10) + (15x^2 + 18x - 20x - 24) \\
 &= 17x^2 - 32x^2 + 20x + 16x - 10 + 15x^2 + 18x - 20x - 24 \\
 &= \boxed{34x - 34}
 \end{aligned}$$

$$\begin{aligned}
 \text{r)} \quad & 20x^2 - \left(7xy - \left(3y^2 - (8x^2 + 11xy + 6y^2) - 12x^2 \right) - 5y^2 \right) - (9xy - 4y^2) \\
 &= 20x^2 - \left(7xy - (3y^2 - 8x^2 - 11xy - 6y^2 - 12x^2) - 5y^2 \right) - 9xy + 4y^2 \\
 &= 20x^2 - (7xy - 3y^2 + 8x^2 + 11xy + 6y^2 + 12x^2 - 5y^2) - 9xy + 4y^2 \\
 &= 20x^2 - 7xy + 3y^2 - 8x^2 - 11xy - 6y^2 - 12x^2 + 5y^2 - 9xy + 4y^2 \\
 &= \boxed{-27xy + 6y^2}
 \end{aligned}$$

$$\begin{aligned}
 \text{s)} & (2x+3)(3x-4)x - (x-11)(x-1) - 6x^3 \\
 &= (6x^2 - 8x + 9x - 12)x - (x^2 - x - 11x + 11) - 6x^3 \\
 &= \cancel{6x^3} + \cancel{x^2} - \cancel{12x} - \cancel{x^2} + \cancel{12x} - 11 - \cancel{6x^3} \\
 &= \boxed{-11}
 \end{aligned}$$

$$\begin{aligned}
 \text{t)} & 40z - \left(8z - (9z - 4) - 2(3z - (7z + 1) - (z - 9)) - (3z - 5(5z - 3)) \right) \\
 &= 40z - \left(8z - 9z + 4 - 2(3z - 7z - 1 - z + 9) - (3z - 25z + 15) \right) \\
 &= 40z - (8z - 9z + 4 - 6z + 14z + 2 + 2z - 18 - 3z + 25z - 15) \\
 &= \cancel{40z} - \cancel{8z} + \cancel{9z} - \cancel{4} + \cancel{6z} - \cancel{14z} - \cancel{2} - \cancel{2z} + \cancel{18} + \cancel{3z} - \cancel{25z} + \cancel{15} \\
 &= \boxed{9z + 27}
 \end{aligned}$$

$$\begin{aligned}
 \text{u)} & 2(x - 5y)^2 \\
 &= 2 \cdot (x^2 - 10xy + 25y^2) \\
 &= \boxed{2x^2 - 20xy + 50y^2}
 \end{aligned}$$

$$\begin{aligned}
 \text{v)} & 7(x+3) \cdot ((x-3) - 7x^2) + x(x-3)^2 \\
 &= (7x+21) \cdot (x-3-7x^2) + x \cdot (x^2-6x+9) \\
 &= \cancel{7x^2} - \cancel{21x} - \cancel{49x^3} + \cancel{21x} - \cancel{63} - \cancel{147x^2} + \cancel{x^3} - \cancel{6x^2} + 9x \\
 &= \boxed{-48x^3 - 146x^2 + 9x - 63}
 \end{aligned}$$

$$\begin{aligned}
 \text{w)} & (a-2)^5 \\
 &= \boxed{a^5 - 10a^4 + 40a^3 - 80a^2 + 80a - 32}
 \end{aligned}$$

$$\begin{aligned}
 \text{x)} & (25a - 13b) - (15a - (14a - 3(4a - 5b) - 8a) - 7(2a + 4b)) \\
 &= 25a - 13b - (15a - (14a - 12a + 15b - 8a) - 14a - 28b) \\
 &= 25a - 13b - (15a - 14a + 12a - 15b + 8a - 14a - 28b) \\
 &= \cancel{25a} - \cancel{13b} - \cancel{15a} + \cancel{14a} - \cancel{12a} + \cancel{15b} - \cancel{8a} + \cancel{14a} + \cancel{28b} \\
 &= \boxed{18a + 30b}
 \end{aligned}$$