

LDDR – Niveau 1: Calcul Littéral Exercices Supplémentaires - solutions

Solutions

Exercice 1 :

$$1) \quad x^2 + (x-1) = \boxed{x^2 + x - 1}$$

$$\text{Coeff} : c_2 = 1 ; c_1 = 1 ; c_0 = -1 \quad \deg(P) = 2$$

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

$$\text{Coeff} : c_3 = 3 ; c_0 = -2 \quad \deg(P) = 2$$

$$3) \quad (3x^2 - 4) + (x+1)^2 = 3x^2 - 4 + x^2 + 2x + 1 = \boxed{4x^2 + 2x - 3}$$

$$\text{Coeff} : c_2 = 4 ; c_1 = 2 ; c_0 = -3 \quad \deg(P) = 2$$

$$4) \quad (x^2 - 9x + 14) + (x-4) = x^2 - 9x + 14 + x - 4 = \boxed{x^2 - 8x + 10}$$

$$\text{Coeff} : c_2 = 1 ; c_1 = -8 ; c_0 = 10 \quad \deg(P) = 2$$

$$5) \quad (x^2 - 11x + 28) - (2x-2)^2 = x^2 - 11x + 28 - (4x^2 - 8x + 4) = \boxed{-3x^2 - 3x + 24}$$

$$\text{Coeff} : c_2 = -3 ; c_1 = -3 ; c_0 = 24 \quad \deg(P) = 2$$

$$6) \quad (z^2 - z) + (z - z^3) = z^2 - z + z - z^3 = \boxed{-z^3 + z^2}$$

$$\text{Coeff} : c_3 = -1 ; c_2 = 1 \quad \deg(P) = 3$$

$$7) \quad 4[(t^2 - 1)^2 - (1-t)^2] = 4[(t^4 - 2t^2 + 1) - (1 - 2t + t^2)] = \boxed{4t^4 - 12t^2 + 8t}$$

$$\text{Coeff} : c_4 = 4 ; c_2 = -12 ; c_1 = 8 \quad \deg(P) = 4$$

$$8) \quad (y+1) + (y^2 - y + 1) = y + 1 + y^2 - y + 1 = \boxed{y^2 + 2}$$

$$\text{Coeff} : c_2 = 1 ; c_0 = 2 \quad \deg(P) = 2$$

$$9) \quad (x-1)^2 + (x^2 + x + 1) = x^2 - 2x + 1 + x^2 + x + 1 = \boxed{2x^2 - x + 2}$$

$$\text{Coeff} : c_2 = 2 ; c_1 = -1 ; c_0 = 2 \quad \deg(P) = 2$$

$$10) \quad -(x^6 + 3x^3 + 9) + (x^3 - 3) = -x^6 - 3x^3 - 9 + x^3 - 3 = \boxed{-x^6 - 2x^3 - 12}$$

$$\text{Coeff} : c_6 = -1 ; c_3 = -2 ; c_0 = -12 \quad \deg(P) = 6$$

$$\begin{aligned}
 11) \quad & \left(\frac{2x-1}{3} \right) - 3 + \left(\frac{x-1}{5} \right) + (x-2) = \frac{2x}{3} - \frac{1}{3} - 3 + \frac{x}{5} - \frac{1}{5} + x - 2 \\
 & = \frac{2}{3}x + \frac{1}{5}x + x - \frac{1}{3} - 3 - \frac{1}{5} - 2 = \left(\frac{2}{3} + \frac{1}{5} + 1 \right)x - \frac{1}{3} - 5 - \frac{1}{5} = \frac{10+3+15}{15}x - \frac{5+75+3}{15} \\
 & = \boxed{\frac{28}{15}x - \frac{83}{15}} \quad \text{Coeff: } c_1 = \frac{28}{15}; c_0 = -\frac{83}{15} \quad \deg(P) = 1
 \end{aligned}$$

$$\begin{aligned}
 12) \quad & \frac{3x^2-4}{2} + \frac{x+1}{4} = \frac{3x^2}{2} - \frac{4}{2} + \frac{x}{4} + \frac{1}{4} = \frac{3}{2}x^2 + \frac{1}{4}x - 2 + \frac{1}{4} = \frac{3}{2}x^2 + \frac{1}{4}x + \frac{-8+1}{4} \\
 & = \boxed{\frac{3}{2}x^2 + \frac{1}{4}x - \frac{7}{4}} \quad \text{Coeff: } c_2 = \frac{3}{2}; c_1 = \frac{1}{4}; c_0 = -\frac{7}{4} \quad \deg(P) = 2
 \end{aligned}$$

$$\begin{aligned}
 13) \quad & \frac{7}{4}(2x+3) + \frac{2x-3}{2} - 1 = \frac{7 \cdot 2}{4}x + \frac{7 \cdot 3}{4} + \frac{2x}{2} - \frac{3}{2} - 1 = \frac{14}{2}x + \frac{21}{4} + x - \frac{3}{2} - 1 \\
 & = \frac{7}{2}x + x + \frac{21}{4} - \frac{3}{2} - 1 = \left(\frac{7}{2} + 1 \right)x + \frac{21}{4} - \frac{3}{2} - 1 = \frac{7+2}{2}x + \frac{21-6-4}{4} = \boxed{\frac{9}{2}x + \frac{11}{4}} \\
 & \text{Coeff: } c_1 = \frac{9}{2}; c_0 = \frac{11}{4} \quad \deg(P) = 1
 \end{aligned}$$

$$\begin{aligned}
 14) \quad & \frac{2}{3}(t-1) - (2t+6) - 4(t-5) = \frac{2}{3}t - \frac{2}{3} - 2t - 6 - 4t + 20 = \frac{2}{3}t - 2t - 4t - \frac{2}{3} - 6 + 20 \\
 & = \left(\frac{2}{3} - 6 \right)t - \frac{2}{3} + 14 = \boxed{-\frac{16}{3}t + \frac{40}{3}} \quad \text{Coeff: } c_1 = -\frac{16}{3}; c_0 = \frac{40}{3} \quad \deg(P) = 1
 \end{aligned}$$

$$\begin{aligned}
 15) \quad & \frac{x^2}{2} + (x-1)^2 = \frac{x^2}{2} + (x^2 - 2x + 1)(x-1) = \frac{x^2}{2} + x^3 - 3x^2 + 3x + 1 = \boxed{x^3 - \frac{5}{2}x^2 + 3x + 1} \\
 & \text{Coeff: } c_3 = 1; c_2 = -\frac{5}{2}; c_1 = 3; c_0 = 1 \quad \deg(P) = 3
 \end{aligned}$$

$$\begin{aligned}
 16) \quad (3y-1) - \frac{1}{2} \left(\frac{2y+6}{8} - \frac{y-5}{3} \right) &= 3y-1 - \frac{\cancel{2}y+\cancel{6}}{\cancel{2}\cdot 8} + \frac{y-5}{2\cdot 3} = 3y-1 - \frac{y}{8} - \frac{3}{8} + \frac{y}{6} - \frac{5}{6} \\
 &= 3y - \frac{1}{8}y + \frac{1}{6}y - 1 - \frac{3}{8} - \frac{5}{6} = \left(3 - \frac{1}{8} + \frac{1}{6} \right) y - 1 - \frac{3}{8} - \frac{5}{6} = \frac{72-3+4}{24} y - \frac{24+9+20}{24} \\
 &= \boxed{\frac{73}{24}y - \frac{53}{24}} \quad \text{Coeff: } c_1 = \frac{73}{24}; c_0 = -\frac{53}{24} \quad \deg(P) = 1
 \end{aligned}$$

$$\begin{aligned}
 17) \quad -\frac{x-1}{2} + \frac{x-2}{3} - \frac{x-3}{4} + \frac{x-4}{5} &= \frac{-(x-1)}{2} + \frac{x-2}{3} + \frac{-(x-3)}{4} + \frac{x-4}{5} \\
 &= \frac{-x+1}{2} + \frac{x-2}{3} - \frac{x+3}{4} + \frac{x-4}{5} = \frac{30(-x+1) + 20(x-2) + 15(-x+3) + 12(x-4)}{60} \\
 &= \frac{-30x+30+20x-40-15x+45+12x-48}{60} = \frac{13x-13}{60} = \boxed{\frac{13}{60}x - \frac{13}{60}} \\
 \text{Coeff: } c_1 &= \frac{13}{60}; c_0 = -\frac{13}{60} \quad \deg(P) = 1
 \end{aligned}$$

Exercise 2 :

$$1) \quad (x+2)^2 = x^2 + 4x + 4$$

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

$$3) \quad (y+5)^2 = y^2 + 10y + 25$$

$$4) \quad (y+7)(y-7) = y^2 - 49$$

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

$$6) \quad (3y-3)^2 = 9y^2 - 18y + 9$$

$$7) \quad (4z+4)(4z-4) = 16z^2 - 16$$

$$8) \quad (6b^2+1)^2 = 36b^4 + 12b^2 + 1$$

$$9) \quad (4m+3)^2 = 16m^2 + 24m + 9$$

$$10) \quad (5s-2)^2 = 25s^2 - 20s + 4$$

$$11) \quad (2a^2-1)^2 = 4a^4 - 4a^2 + 1$$

$$12) \quad (x^2+\sqrt{5})(x^2-\sqrt{5}) = x^4 - 5$$

$$13) \quad (x^3+2^3)^2 = x^6 + 2x^3 \cdot 2^3 + 2^6 = \boxed{x^6 + 16x^3 + 64}$$

$$14) \quad (x+2)(x-12) = x^2 - 10x - 24$$

$$15) \quad (a+1)(a-1)(a^2+1)(a^4-1) = (a^2-1)(a^2+1)(a^4-1) = (a^4-1)(a^4-1) = \boxed{a^8 - 2a^4 + 1}$$

$$16) \quad (a^2+6)(a^2+4) = a^4 + 10a^2 + 24$$

$$17) \quad \left(7a - \frac{1}{2} \right)^2 = 49a^2 - 7a + \frac{1}{4}$$

$$18) \quad (ax^2-1)(ax^2-19) = a^2x^4 - 20ax^2 + 19$$

$$19) (4a^4 - 2^4)^2 = 16a^8 - 8a^4 2^4 + 2^8 = \boxed{16a^8 - 128a^4 + 256}$$

$$20) (6ax - a^2)(6ax + a^2) = 36a^2x^2 - a^4$$

$$21) (9z - 2)(9z + 2) = 81z^2 - 4$$

$$22) \left(10x - \frac{1}{10}\right)\left(10x + \frac{1}{10}\right) = 100x^2 - \frac{1}{100}$$

$$23) (x-1)(x^2+1)(x+1) = (x^2-1)(x^2+1) = \boxed{x^4-1}$$

$$24) (x+2)(x-2)(x^4+16)(x^2+4) = (x^2-4)(x^2+4)(x^4+16) = (x^4-16)(x^4+16) \\ = (x^4)^2 - (16)^2 = \boxed{x^8-256}$$

$$25) (x^2-1)(x^2+1)(x^4-8) = (x^4-1)(x^4-8) = \boxed{x^8-9x^4+8}$$

$$26) \left(\frac{1}{2}a+3\right)\left(\frac{1}{2}a-3\right)\left(\frac{1}{4}a^2+3^2\right) = \left(\frac{1}{4}a^2-3^2\right)\left(\frac{1}{4}a^2+3^2\right) = \left(\frac{1}{4}a^2\right)^2 - (3^2)^2 = \boxed{\frac{1}{16}a^4-81}$$

$$27) (0,01w-5)(0,01w+5)(0,01w^2+5^2) = (0,01w^2-5^2)(0,01w^2+5^2) = \boxed{0,0001w^4-625}$$

Exercice 3 :

$$1) (x+7)^2$$

$$2) (x-9)(x-7)$$

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

$$4) (2x+5)^2$$

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

$$6) (x+21)(x-1)$$

$$7) (x-5)(x-6)$$

$$8) 4(3x-1)^2$$

$$9) 2(x+1)(x+12)$$

$$10) (3t+7)(3t-7)$$

$$11) (x+9)(x-7)$$

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

$$13) (x+3)(x-13)$$

$$14) (x+1)(x-12)$$

$$15) (3x+2)(3x-2)$$

$$16) (x-12)^2$$

$$17) (x-1)(x-21)$$

$$18) 2(x+4)^2$$

$$19) 16(t+2)^2$$

$$20) (v+6)(v+5)$$

$$21) 2(a-4)(a-3)$$

$$22) (x+12)(x-1)$$

$$23) (3x-2)^2$$

$$24) 3(x+3)(x+4)$$

$$25) 4(x-6)(x+5)$$

$$26) (x-21)(x+1)$$

$$27) (x+7)(x+9)$$

$$28) (x+1)(x+21)$$

$$29) (x-9)^2$$

$$30) (x-18)(x+2)$$

$$31) 5(x+5)(x-5)$$

$$32) (x-18)(x-2)$$

$$33) 4(3x+1)^2$$

$$34) (x+18)(x-2)$$

$$35) (x+18)(x+2)$$

$$36) (x+3)(x+13)$$

$$37) (x-1)(x-12)$$

$$38) (x+13)(x-3)$$

$$39) (-2)(x+6)(x-5)$$

$$40) (x+13)(x-3)$$

$$41) (x-3)^2$$

$$42) 4(3x+2)(3x-2)$$

$$43) (2x+1)(2x-1)$$

$$44) (-2)(x+1)(x+12)$$

$$45) (y-4)(y+3)$$

$$46) 3(3z+2)(3z-2)$$

$$47) (4t+3)^2$$

$$48) -3(u-3)^2$$

$$49) (1+2x)(1-2x)$$

$$50) \text{ Déjà factorisé}$$

$$51) (x-2)^2$$

$$52) \text{ Déjà factorisé}$$

$$53) \text{ Pas factorisable}$$

$$54) (x-10)(x+10)$$

$$55) \text{ Déjà factorisé}$$

$$56) \text{ Déjà factorisé}$$

$$57) \text{ Pas factorisable}$$

$$58) (-1)(x+4)(x-8)$$

$$59) 4(z+1)^2$$

$$60) \text{ Pas factorisable}$$

61) $6(x-1)^2$

62) $3(2y-1)^2$

63) $5(3t-1)^2$

64) $2(3x+1)^2$

65) $4(x+3)(x-7)$

66) $2(x+2)(x-12)$

67) $2(x+5)(x+4)$

68) $3(x+5)(x-4)$

69) $4(x+4)(x+3)$

70) $a(x+1)(x-5)$

71) $2c(x-2)(x-7)$

72) $3k(x+3)(x-7)$

73) $4m^2(x+2)(x-12)$

74) $3a^2x(x-1)$