

LDDR: Niveau 1: Calcul Littéral.

EXERCICE 1

- 1) $(x-2)(3x+4) = 3x^2 - 6x + 4x - 8 = 3x^2 - 2x - 8$
- 2) $x^2 + (3x^2 - 2x) = x^2 + 3x^2 - 2x = 4x^2 - 2x$
- 3) $u^6 - [(3u^2 - 2u)(-2u + u + 3) + u^3 - 4] =$
 $= u^6 - [(3u^2 - 2u)(-u + 3) + u^3 - 4] =$
 $= u^6 - (-3u^3 + 2u^2 + 9u^2 - 6u + u^3 - 4) =$
 $= u^6 - (-2u^3 + 11u^2 - 6u - 4) =$
 $= u^6 + 2u^3 - 11u^2 + 6u + 4$
- 4) $(x^2 - 3x + 28) - 3x(x - 3) = x^2 - 3x + 28 - 3x^2 + 9x =$
 $= -2x^2 + 6x + 28$
- 5) $4[2(x - 2y) - 3(y - 2x)] = 4[2x - 4y - 3y + 6x] =$
 $= 4(8x - 7y) = 32x - 28y$
- 6) $(x+1)(2x-4)(3-x) = (2x^2 + 2x - 4x - 4)(3-x) =$
 $= (2x^2 - 2x - 4)(3-x) = 6x^2 - 6x - 12 - 2x^3 + 2x^2 + 4x$
 $= -2x^3 + 8x^2 - 2x - 12$
- 7) $5[(x^2 - 4x) - (2x^2 + 4x)] = 5(x^2 - 4x - 2x^2 - 4x) =$
 $= 5(-x^2 - 8x) = -5x^2 - 40x$
- 8) $-(x^6 - 3x^3 + 9) + (x^3 - 9) = -x^6 + 3x^3 - 9 + x^3 - 9 =$
 $= -x^6 + 4x^3 - 18$
- 9) $-(x-2)(x+4) + (x+3)(x-2) =$
 $= -(x^2 - 2x + 4x - 8) + (x^2 - 2x + 3x - 6) =$
 $= -x^2 - 2x + 8 + x^2 + x - 6 = -x + 2$
- 10) $3(2x^2 + 4x) - 6x(x+2) = 6x^2 + 12x - 6x^2 - 12x = 0$

EXERCICE 2

1. $(4r^2 - 3s)^2 = 16r^4 - 24r^2s + 9s^2$
2. $(13a^2 + 4b)(13a^2 - 4b) = 169a^4 - 16b^2$
3. $(a^3 - a^2)^2 = a^6 - 2a^5 + a^4$
4. $(2a+b)^3 = 8a^3 + 3 \cdot (2a)^2 b + 3(2a)b^2 + b^3 =$
 $= 8a^3 + 12a^2b + 6ab^2 + b^3$
5. $(c^2 - d^2)^3 = c^6 - 3(c^2)^2 d^2 + 3c^2 d^4 - d^6 =$
 $= c^6 - 3c^4 d^2 + 3c^2 d^4 - d^6$

$$6. (\sqrt{2}x - \sqrt{3}y)^2 = 2x^2 - 2\sqrt{6}xy + 3y^2$$

$$7. \left(\frac{1}{4}x + 2y\right)^2 = \frac{1}{16}x^2 + xy + 4y^2$$

$$8. (-5x + \frac{1}{5}y)^2 = 25x^2 - 2xy + \frac{1}{25}y^2$$

$$9. (2x + 2y)^2 = 4x^2 + 8xy + 4y^2$$

$$10. 2(x + 2y)^2 = 2(x^2 + 4xy + 4y^2) = 2x^2 + 8xy + 8y^2$$

EXERCISE 3

$$1. 4x^2 + 16x = 4x(x + 4)$$

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

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

$$4. (x - 2)^2 - (x - 2)(x + 4) - (x - 2) = (x - 2)(x - 2 - x - 4 - 1) = (x - 2)(-7) = -7(x - 2)$$

$$5. 27x^2 + 4y^2 = x^2(27y^2 + 4)$$

$$6. x^2 + xy - 2x - 2y = x(x + y) - 2(x + y) = (x + y)(x - 2)$$

$$7. x^3 - 3y^3 + 3x^2y + xy^2 = x(x^2 - 3y^2 + 3xy + y^2) = x(x + y)^2$$

$$8. 2x(3x + 4y) - 3y(3x + 4y) = (3x + 4y)(2x - 3y)$$

EXERCISE 4

$$1. \frac{x^2}{x-2} - \frac{x^2+5}{x^2-3x} = \frac{x^2}{x-2} - \frac{x^2+5}{x(x-3)} = \frac{x^2 \cdot x(x-3) - (x^2+5)(x-2)}{x(x-2)(x-3)} = \frac{x^4 - 3x^3 - x^3 - 5x + 2x^2 + 10}{x(x-2)(x-3)} = \frac{x^4 - 4x^3 + 2x^2 + 10}{x(x-2)(x-3)}$$

$$2. \frac{x}{2x-y} + \frac{-y}{2x} = \frac{2x^2 - y(2x-y)}{2x(2x-y)} = \frac{2x^2 - 2xy + y^2}{2x(2x-y)}$$

$$3. \frac{6}{x^2-4} - \frac{3x}{x^2-4} = \frac{6-3x}{(x-2)(x+2)} = \frac{-3(x-2)}{(x-2)(x+2)} = \frac{-3}{x+2}$$

$$4. \frac{a^3-8}{a^2-4} : \frac{a}{a^2+8} = \frac{(a-2)(a^2+2a+4)}{(a-2)(a+2)} \cdot \frac{(a+2)(a^2-2a+4)}{a} = \frac{(a^2+2a+4)(a^2-2a+4)}{a}$$

$$5. \frac{15}{x^2-9} - \frac{5x}{x^2-9} = \frac{15-5x}{x^2-9} = \frac{5(3-x)}{(x-3)(x+3)} = \frac{-5(x-3)}{(x-3)(x+3)} = \frac{-5}{x+3}$$

$$6. \frac{x^2+4}{2x} + \frac{2}{x+2} = \frac{(x^2+4)(x+2)+4x}{2x(x+2)} = \frac{x^3+4x+2x^2+8+4x}{2x(x+2)}$$

$$= \frac{x^3+2x^2+8x+8}{2x(x+2)}$$

$$7. \frac{(a^2-2ab+b^2)^2(a+b)^5(a^2-ab+b^2)(a^2+ab+b^2)}{(a^3-b^3)(a^2-b^2)(a^3-b^3)(a^3+3ab^2+3a^2b+b^3)} =$$

$$= \frac{(a-b)^4(a+b)^5(a^2-ab+b^2)(a^2+ab+b^2)}{(a-b)(a^2+ab+b^2)(a-b)(a+b)(a-b)(a^2+ab+b^2)(a+b)^3} =$$

$$= \frac{(a-b)(a+b)^3(a^3+b^3)}{(a^2+ab+b^2)(a+b)^3} = \frac{(a-b)(a^3+b^3)}{a^2+ab+b^2}$$

$$8. \frac{6x^2yz^3-xy^2z}{xyz} = \frac{xyz(6xz^2-y)}{xyz} = \frac{6xz^2-y}{1}$$

$$9. \frac{8x^2y^3-10x^3y}{2x^2y} = \frac{2x^2y(4y^2-5x)}{2x^2y} = 4y^2-5x$$

$$10. \frac{3u^3v^4-5u^5v^2+(u^3v^2)^2}{u^3v^2} = \frac{3u^3v^4-5u^5v^2+u^4v^4}{u^3v^2} =$$

$$= \frac{u^3v^2(3v^2-5u^2+uv^2)}{u^3v^2} = 3v^2-5u^2+uv^2$$

EXERCISE 5.

$$1. 5x+8=3 \Leftrightarrow 5x=-5 \Leftrightarrow x=-1$$

$$2. 4x^2+2x-5=0 \quad \Delta = 4+80=84 \quad x_{1,2} = \frac{-2 \pm \sqrt{84}}{8}$$

$$3. -4x^2+6=-3x \Leftrightarrow 4x^2-3x-6=0$$

$$\Delta = 105 \quad x_{1,2} = \frac{3 \pm \sqrt{105}}{8}$$

$$4. +4x-5=3 \Leftrightarrow 4x=8 \Leftrightarrow x=2$$

$$5. x^2+7x=0 \Leftrightarrow x(x+7)=0 \Leftrightarrow x=0 \quad x=-7$$

$$6. 8x+9=7-3x \Leftrightarrow 11x=-2 \Leftrightarrow x=-\frac{2}{11}$$

$$7. 10+5x=-2x^2 \Leftrightarrow 2x^2+5x+10=0$$

$$\Delta = -55 < 0 \quad \text{impossible}$$

$$8. 3x = -4x^2 \Leftrightarrow 4x^2+3x=0 \Leftrightarrow x(4x+3)=0 \Leftrightarrow$$

$$x=0 \quad 4x+3=0 \Leftrightarrow x=-\frac{3}{4}$$