

LDDR - Niveau 1 - TE3 : Calcul - Algèbre.

EXERCICE 1

- 1) « $a^2 < \sqrt{5}$ » a au carré plus petit que la racine de 5
- 2) $A = [-2, \infty[$ $B = [-4, 5[$
 - a) B : intervalle de -4 fermé (compris) à 5 ouvert
 - b) $A \cup B = [-4, \infty[$
 - c) $\bar{A} \cap B = [-4, -2[$
- 3) $\{x \in \mathbb{R} \mid x^2 > 5\} =]-\infty, -\sqrt{5}[\cup]\sqrt{5}, \infty[$

EXERCICE 2

- 1) $\frac{2}{5} - \left(\frac{7}{10}\right)^2 : \frac{35}{4} = \frac{2}{5} - \frac{49}{100} \cdot \frac{4}{35} = \frac{2}{5} - \frac{7}{125} = \frac{10-7}{125} = \frac{3}{125}$
- 2) $(e^2 f^{-4})^3 : (\sqrt[3]{e^{-6} f^2})^2 = \frac{e^6 f^{-12}}{25} : e^{-2} f^4 = \frac{e^6}{f^{12}} \cdot \frac{e^2}{f^4} = \frac{e^8}{f^{16}}$
- 3) $\sqrt[4]{c^5} \cdot \frac{1}{c^2} = \frac{c^{5/4}}{c^2} = c^{5/4-2} = c^{-3/4} = \frac{1}{\sqrt[4]{c^3}}$
- 4) $(25)^{1/2} : 2^{-2} = \frac{(5^2)^{1/2}}{2^2} = \frac{5}{4}$
- 5) $\sqrt{18} - \sqrt{50} = 3\sqrt{2} - 5\sqrt{2} = -2\sqrt{2}$
- 6) $\frac{6}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$
- 7) $\frac{3\sqrt{5}}{2-\sqrt{5}} = \frac{3\sqrt{5}(2+\sqrt{5})}{4-5} = -3\sqrt{5}(2+\sqrt{5})$
- 8) $(3+\sqrt{11})(9-2\sqrt{11}) = 27 + 9\sqrt{11} - 6\sqrt{11} - 2 \cdot 11 = 5 + 3\sqrt{11}$
- 9) $\frac{2m}{m^2-1} = \frac{2}{m+1} = \frac{2m}{(m-1)(m+1)} - \frac{2}{m+1} = \frac{2m-2(m-1)}{(m+1)(m-1)} = \frac{2m-2m+2}{(m+1)(m-1)} = \frac{2}{(m-1)(m+1)}$

EXERCICE 3

- 1) a) $64x^2 - 25 = 0 \Leftrightarrow 64x^2 = 25 \Leftrightarrow x^2 = \frac{25}{64} \Leftrightarrow x = \pm \frac{5}{8}$
b) $x^5 - 4x^3 = 0 \Leftrightarrow x^3(x^2 - 4) = 0 \Leftrightarrow x^3(x-2)(x+2) = 0$
 $\Leftrightarrow x=0 \quad x=2 \quad x=-2$
- 2) a) $x^2 + 14x - 50 = 0 \Leftrightarrow (x+7)^2 - 49 - 50 = 0 \Leftrightarrow (x+7)^2 - 99 = 0$
b) $2x^2 - 12x + 220 = 2(x^2 - 6x + 110) = 2[(x-3)^2 - 9 + 110] = 2[(x-3)^2 + 101]$

$$3) 9x^4 - 6x^3 + \frac{x^2}{1} = \left(\frac{3x^2}{1} + \frac{x}{1} \right)^2$$

$$\begin{aligned} 4) (x^2+8)^2 - (4x-5)^2 &= x^4 + 16x^2 + 64 - (16x^2 - 40x + 25) = \\ &= x^4 + \cancel{16x^2} + 64 - \cancel{16x^2} + 40x - 25 = \\ &= x^4 + 40x + 39 \end{aligned}$$