LDDR - Niveau 2 - TE1 : Ensembles

EXERCICE 1

a) $A = \left\{ x \mid x = (-1)^n \dfrac{(n-2)^2}{2(n+1)} \quad n \leq 4, n \in \mathbb{N}^* \right\}$

$n=1 \quad x = -\frac{1}{4}$ $\quad n=2 \quad x = 0$

$n=3 \quad x = -\frac{1}{8}$ $\quad n=4 \quad x = \frac{4}{10} = \frac{2}{5}$

$A = \left\{ -\frac{1}{4} ; 0 ; -\frac{1}{8} ; \frac{2}{5} \right\}$

b) $B = \left\{ x \mid x^2 (2x^2+3)(x^2-1) = 0 \quad x \in \mathbb{Z} \right\}$

$x^2 (2x^2+3)(x-1)(x+1) = 0 \Leftrightarrow x = 0, x = 1, x = -1$

$B = \{ 0 ; 1 ; -1 \}$

EXERCICE 2

$E = \{ x \mid x = n, \ n < 13 \quad n \in \mathbb{N}^* \}$ $\quad A = \{1;2;3;4;5\}$

$\bar{B} = \{4;7;11\}$ $\quad E = \{1;2; \ldots ;12\}$ $\quad \bar{A} = \{6;7;\ldots;12\}$

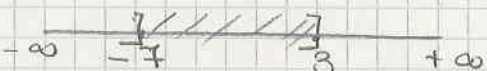
$B = \{1;2;3;5;6;8;9;10;12\}$

$B \cap \bar{A} = \{6;8;9;10;12\}$

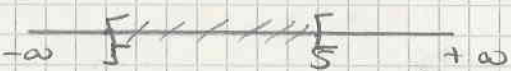
EXERCICE 3

1. $A = [-5, +\infty[$

$B =]-7;3]$



$C = [1;5[$



2. $A \cup B =]-7, +\infty[$ $\quad (A \cup B) \setminus C =]-7;1[\cup [5, +\infty[$

$B \cap C = [1;3]$ $\quad B \setminus (B \cap C) =]-7;1[$

EXERCICE 4

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

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

c) $2k^2 - \ell^2 k + 2k^3 - \ell^2 = 2k^2(1+k) - \ell^2(k+1) =$

$= (k+1)(2k^2 - \ell^2) = (k+1)(\sqrt{2}k - \ell)(\sqrt{2}k + \ell)$

EXERCICE 5

a) $\dfrac{x - \sqrt{7}}{x^2 - 7} = \dfrac{x - \sqrt{7}}{(x-\sqrt{7})(x+\sqrt{7})} = \dfrac{1}{x+\sqrt{7}}$

b) $\dfrac{49x^2 - 28xy + 4y^2}{7x - 2y} = \dfrac{(7x-2y)^2}{7x-2y} = 7x - 2y$

c) $\dfrac{81x^3-18x^2+x}{1-81x^2} = \dfrac{x(81x^2-18x+1)}{(1-9x)(1+9x)} = \dfrac{x(9x-1)^2}{-(9x-1)(1+9x)} =$

$= \dfrac{x(9x-1)}{-(9x+1)} = \dfrac{x(1-9x)}{9x+1}$