EXERCISE: 1

1 - Determine the supremum and the infimum (and justify your answer) of the following set : $A = \left\{ \dfrac{m}{2m+3n}, \ m, n \in N \right\}$

2 - Find $\quad sup\{ x \in R, \ x^2 - x - 2 < 0 \}.$

3 – Prove that $\sqrt{3}$ Is irrational.

4 – Find $\quad \limsup_{n \to +\infty} \left\{ 2 + \dfrac{(-1)^n}{3n} \right\} \quad$ and $\quad \liminf_{n \to +\infty} \left\{ 2 + \dfrac{(-1)^n}{3n} \right\}$

EXERCISE: 2

1 - Using the definition find the limit of the sequence $\dfrac{3^n - 1}{2^n + 1}$.

2 – We consider the sequence $x_n = \dfrac{1}{n+1} + \dfrac{1}{n+2} + \cdots + \dfrac{1}{2n}$. Prove that this sequence is increasing, convergent an its limit belongs to $\left[\dfrac{1}{2}, 1\right]$.

3- Prove that $y_n = 1 + \dfrac{1}{2} + \cdots + \dfrac{1}{n}$ is not a Cauchy sequence.

EXERCISE: 3

1 –Find the sum of the series: $\displaystyle\sum_{n=1}^{+\infty} \dfrac{1}{n(n+1)} \quad$ and $\quad \displaystyle\sum_{n=4}^{+\infty} (2^n + (-3)^{3n})$

2 –Test the convergence of the series: $\displaystyle\sum_{n=1}^{+\infty} \dfrac{n+\sin(n)}{n+\cos(n)} \quad$ and $\quad \displaystyle\sum_{n=1}^{+\infty} \dfrac{n^p + 1}{n^q + 1}$