MATH3224 - Final Exam Review Sheet - Summer 1- 04 - Konaté

Notice: Show your work. A right answer with a bad reasoning will be considered as wrong.

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1 • determine the domain and the range of functions, $f(x) = \ln(|x|)$ and $g(x) = \frac{1}{x}$.

Determine the domaim and range and find the functions gof and fog.

2• a and b are two positif real numbers such that $0 < a < b$. Montrer: $a < \sqrt{ab} < b$ and $\sqrt{ab} \leq \frac{1}{2}(a+b)$.

3• Find the limit points of the sequence $a_n = \dfrac{(-1)^n}{1+n}$; $b_n = (-1)^n + \dfrac{1}{1+n}$; $c_n = \sin(\frac{n\pi}{4})$.

4 • Consider the function $f(x) = \frac{2}{5}x + 1$ on $\mathbf{R}$. Determiner δ such that $|x-1| \leq \delta$ implies $|f(x) - f(1)| \leq \epsilon$ for ϵ given.

5 • Consider a function f continuous on the bounded interval I =[a,b]. Set

$$F(x) = \int_a^x f(t)dt$$

Prove F is Lipschitz continuous on I.

6 • Let $g_n(x) = \frac{x}{n}\exp(-\frac{x}{n})$. Prove that g_n converges pointwise.

7 • Determine if the series is convergent or not $\displaystyle\sum_{n=1}^{+\infty} \frac{2^{n+1}}{3^{2n}}$

8• determine the open interval of the values of x for which the series $\displaystyle\sum_{n=1}^{+\infty} \frac{(3x-2)^n}{n3^n}$ is absolutely convergent.

9 • Assume a and b are limit point to the sequences $\{a_n\}_{n\in\mathbf{N}}$ and $\{b_n\}_{n\in\mathbf{N}}$. Is $a+b$ limit point to $\{(a_n+b_n)\}_{n\in\mathbf{N}}$?
