University of DJilaly Bounaama – khmis meliana - University
Faculty of Economic, Commercial and Management Sciences
First Year Bachelor's Degree - Joint Trunk -

Year: 2024/2023
Scale: Mathematics 1
Branch: 2

Series No. 03 : Numerical Functions

Exercise 01: Calculate the following endings:

$$;\quad \lim_{x\to 0}\frac{\sin x}{\tan x}\quad ;\quad \lim_{x\to 3}\frac{\sqrt{x^2-9}}{x-3}\quad ;\quad \lim_{x\to\infty}\frac{\sqrt{x^2+1}}{x+1}$$

$$\lim_{x\to 2}\frac{x-2}{\sqrt{x^2-4}}$$

$$\lim_{x\to 0}\frac{e^{2x}-1}{3x^2+x}\quad ;\quad \lim_{x\to 1}\frac{x\ln x-x+1}{(x-1)\ln x}$$

Exercise 02 : Study the continuity of the following functions:

$$g(x)=\begin{cases}(x+1)e^{x^2}, x\geq -1\\ (x+1)^2\cos\left(\frac{3}{x+1}\right), x<-1\end{cases} ; f(x)=\begin{cases}\ln(1+x), x\geq 0\\ x^4\sin\left(\frac{5}{x}\right), x<0\end{cases}$$

Exercise 03 :

1- Find "a" values so that f and g are continuous

$$: \quad g(x)=\begin{cases}\frac{\sqrt{x+2}-2}{x-2}, x>2\\ a+e^{x-2}, x\leq 2\end{cases} ; f(x)=\begin{cases}\frac{\ln(x+1)}{x}, x<0\\ x^5+2+a, x\geq 0\end{cases}$$

2- Is it possible to continue extending the f function where:

$$f(x)=\frac{\sqrt{x-1}-2}{x-5}, x\neq 5$$

Exercise 04 :

Create a definition set for each function in the following cases:

$$;\quad f_2(x)=-\frac{x}{2}+\ln\left|\frac{x-1}{x}\right|\quad ;\quad f_1(x)=\sqrt{(x+2)}+\frac{1}{x+1}$$

$$f_3(x)=e^{\frac{1}{x^2}}$$

$$f_5(x)=\frac{2|x-1|}{x^2+2x+2}\quad ;\quad f_4(x)=2x-|x|\ln(x^2)$$

$$f_7(x)=\begin{cases} x+\frac{1}{2}\frac{+1}{x^2+1}, x\leq 0 \\ \frac{x}{x^2-1}+\frac{3}{2}, x>0 \end{cases}; f_6(x)=\begin{cases} \frac{3(x+1)}{\sqrt{x+2}}, x\leq 1 \\ \frac{x^2}{2x-1}, x>1 \end{cases}$$