Ministry of Education
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Midterm 1

Course Name: Calculus I
Course Code: MAT 101
Semester/Year: Second/1436-1437
Date/Time: 21-5-1437 / 4:00 pm
Duration: 75 min's

Instructions: Only ordinary calculators are allowed.

Question 1.[ 10 marks ] Evaluate the following limits:
(i) $\lim _{x \rightarrow 0} \frac{x}{\sqrt{x+3}-\sqrt{3}}$
(ii) $\lim _{x \rightarrow 2} \frac{|x-2|}{x-2}$
(iii) $\lim _{x \rightarrow-\infty} \frac{-x}{\sqrt{x^{2}+1}}$
(iv) $\lim _{x \rightarrow \infty} \frac{\cos x}{x^{2}}$
(v) $\quad \lim _{x \rightarrow 0} \frac{\sin 2 x \cdot \cos 3 x}{x}$

Question 2.[3 marks ] Find the values of $a$ and $b$ in order to the following function be continuous:

$$
f(x)= \begin{cases}\frac{2 \sin (3 x)}{x}, & \text { if } \quad x<0 \\ b+1, & \text { if } \quad x=0 \\ a \cos (2 x)-1, & \text { if } \quad x>0\end{cases}
$$

Question 3. [ 3 marks ] Find the vertical and horizontal asymptotes for:

$$
f(x)=\frac{4-x^{2}}{x^{2}-9}
$$

Question 4. [ 4 marks ]
(a) Use the formal definition of the limit to prove that $\lim _{x \rightarrow 1}(5 x-1)=4$.
(b) Use the definition of the derivative to find $f^{\prime}(x)$ if $f(x)=x^{2}+3$.

End Questions 83 Good Luck)

