

Serial No.: _____ Student Name: _____ Student Number: _____
Instructor: M. Z. Abu-Sbeih Math 101- Q2 Date: 19-3-2007

Problem 1: (3 points) Find the limit if it exists.

$$\lim_{x \rightarrow -\infty} \frac{x+2}{\sqrt{9x^2+1}}$$

Problem 2: (5 points) Find all **vertical and horizontal** asymptotes of the function $f(x) = \frac{1}{2+e^{\frac{1}{x}}}$

Problem 3: (4 points)

(a) Find all points where the function $f(x) = \frac{1}{x\sqrt{x-3}}$ is discontinuous.

(b) Find the value of k which will make the function $f(x) = \begin{cases} \frac{x^2-1}{x-1} & \text{if } x \neq 1 \\ k & \text{if } x = 1 \end{cases}$ continuous at 1.

Problem 4: (4 points) Use the definition of the derivative to find $f'(2)$ where $f(x) = \frac{1}{\sqrt{x-1}}$.

Problem 5: (4 points) Find the slope of the line tangent to the curve $f(x) = \frac{1}{x+2}$ at $x = 1$.

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$$\lim_{x \rightarrow -\infty} \frac{x+2}{\sqrt{x^2+1}}$$

Problem 2: (5 points) Find all **vertical and horizontal** asymptotes of the function $f(x) = \frac{1}{1+e^{\frac{x}{2}}}$

Problem 3: (4 points)

(a) Find all points where the function $f(x) = \frac{1}{x\sqrt{x-2}}$ is discontinuous.

(b) Find the value of k which will make the function $f(x) = \begin{cases} \frac{x^2-1}{x+1} & \text{if } x \neq -1 \\ k & \text{if } x = -1 \end{cases}$ continuous at 1.

Problem 4: (4 points) Use the definition of the derivative to find $f'(3)$ where $f(x) = \frac{1}{\sqrt{x+1}}$.

Problem 5: (4 points) Find the **instantaneous rate of change** of $f(x) = \frac{1}{x+1}$ at $x = 1$.

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Problem 1: (3 points) Find the limit if it exists.

$$\lim_{x \rightarrow -\infty} \frac{x+2}{\sqrt{4x^2+1}}$$

Problem 2: (5 points) Find all **vertical and horizontal** asymptotes of the function $f(x) = \frac{2}{1+e^{\frac{1}{x}}}$

Problem 3: (4 points)

(a) Find all points where the function $f(x) = \frac{1}{x\sqrt{x-1}}$ is discontinuous.

(b) Find the value of k which will make the function $f(x) = \begin{cases} \frac{x^2-4}{x-2} & \text{if } x \neq 2 \\ k & \text{if } x = 2 \end{cases}$ continuous at 1.

Problem 4: (4 points) Use the definition of the derivative to find $f'(0)$ where $f(x) = \frac{1}{\sqrt{x+1}}$.

Problem 5: (4 points) Find the **instantaneous velocity** of a particle whose position function is

$$f(x) = \frac{1}{x-2} \text{ at } x = 1.$$