King Fahd University of Petroleum and Minerals | Serial #: ____ St. Number: _____
Department of Mathematics and Statistics | Name: _____
Instructor: M. Z. Abu-Sbeih | Math - 132.1 | Test No. 1 | Date: 8-10-2013.

Note: Show all your work. No credits for answers not supported by work.

Problem 1: (30 points) Find each of the following limits if it exists. (DO ONLY 3 PROBLEMS)

(a) $\lim_{x\to 2} \dfrac{x^2-x-2}{x-2}$

(b) $\lim_{x\to -\infty} \dfrac{x^2-1}{x^3+4x-3}$

(c) $\lim_{x\to 2^-} \left[2-\dfrac{1}{x-2}\right]$

(d) $\lim_{x\to \infty} \left[\sqrt{x^2+x}-x\right]$

Problem 2: (30 points)

(a) Find all values of *A* and *B* which will make the function continuous at $x = 1$.

$$f(x)=\begin{cases} \sqrt{1-x} & if \quad x<1 \\ A & if \quad x=1 \\ 2x+B(x+1) & if \quad x>1. \end{cases}$$

(b) Use the definition of the derivative to find $f'(2)$ for the function $f(x)=x^2+1$.

(c) The position function of a moving object is $s=f(t)=3t^2-t+1$, where *t* is in seconds and *s* is in meters.

i. Find the average velocity over the interval [5, 5.1]

ii. Find the velocity at $t=5$.

Problem 3: (40 points)

(a) If $y=(x+1)^{e^x}$, find y' at (0,1)

(b) Find the slope of the line tangent to the graph of $x^2+y^2=4-2xy^3$ at the point (1,1).

(c) Find $\dfrac{d^2y}{dx^2}$ for the function $y=2^{3x}-\log_3 x$

(d) If $y=\sqrt{\dfrac{(x+1)^3(x-2)}{(2x+1)}}$, find y'