King Fahd University of Petroleum and Minerals | Serial #: ____ St. Number: _____
Department of Mathematics and Statistics | Name: _____
Instructor: M. Z. Abu-Sbeih | Math - 132.6 | Test No. 1 | Date: 3-3-2013.

**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.

(a) $\lim\limits_{x\to 3} \dfrac{x^2-x-6}{x^2-9}$

(b) $\lim\limits_{x\to 0^+} \dfrac{x}{\sqrt{x^2+4}-2}$

(c) $\lim\limits_{x\to\infty} \dfrac{3x^2+4x-9}{1+3x-2x^2}$

Problem 2: (20 points)

(a) Find all vertical and horizontal asymptotes of $y=\dfrac{x}{2x^2-x}$.

(b) Find all values of A and B which will make the function continuous at $x = 2$.

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

Problem 3: (20 points)

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

(b) The cost function of producing $x$ units is $C(x)=x^3-6x^2+15x$

(i) Find the marginal cost function.

(ii) Estimate the cost of producing the unit number 11. (Do not find the exact cost)

Problem 4: (30 points)

(a) If $y=(x+1)^x$, find $y'(1)$.

(b) Find the slope of the line tangent to the graph of $y+xe^y=1$ at the point $(1,0)$.

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