King Fahd University of Petroleum and Minerals | Serial #: ____ St. Number: _____
Department of Mathematical Sciences | Name: _____
Instructor: M. Z. Abu-Sbeih | Math - 132.1 | Test No. II | Date: 28-11-2013.

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

Problem 1: (25 points) Consider the function $y = f(x) = 4x^2 - x^4$

a. Find the critical numbers.

b. Find intervals where the function is increasing and those where it is decreasing.

c. Find the local maximum and minimum of the function.

d. Discuss the concavity of the function and find the infection points.

e. Sketch the graph of the function. Clearly indicate the critical numbers, extrema and inflection points on the graph.

Problem 2: (10 points) Find all vertical and horizontal asymptotes of $y = 1 + \frac{x}{1-x}$.

Problem 3: (10 points) A rectangular portion of a field is to beenclosed by a fince and devided equaly into two partsby a fince parrallel to one pair of sides. If the total of 600 ft of fencing is to be used, find the dimentions that will maximize the fenced area, and **find this maximum area**.

Problem 4: (10 points) Use differentials to approximate $e^{0.001}$.

Problem 5: (10 points) Find the area enclosed by the graphs of $y = (x-1)^2$ and $y = x + 1$.

Problem 6: (35 points) Evaluate the integrals:

(a) $\int_1^2 \frac{e^{\sqrt{x}} dx}{\sqrt{x}}$

(b) $\int (x+1) e^x \, dx$

(c) $\int \frac{1}{x \ln x} dx$

(d) $D_x\left(\int_1^3 \sqrt{x^3 + x} \, dx\right)$

(e) $\int 2\sqrt{10^{4x}} \, dx$