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: 15-4-2015.

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

Problem 1: (40 points) Consider the function $y = \dfrac{x^2}{x-2}$ with $y' = \dfrac{x(x-4)}{(x-2)^2}$, $y'' = \dfrac{8}{(x-2)^3}$

a. Find all vertical, horizontal and slant asymptotes, if any exist.

b. Find the critical numbers.

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

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

e. Find intervals where the function is concave up and those where the function is concave down, also find the infection points if any exist.

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

Problem 2: (10 points) A rectangular portion of a field is to beenclosed by a fince and devided equaly into three parts by two finces parrallel to one pair of sides. If the total of 800 ft of fencing is to be used, find the dimentions that will maximize the fenced area, and **find this maximum area**.

Problem 3: (10 points) Use differentials to approximate $\ln 1.01$.

Problem 4: (40 points) Evaluate the integrals:

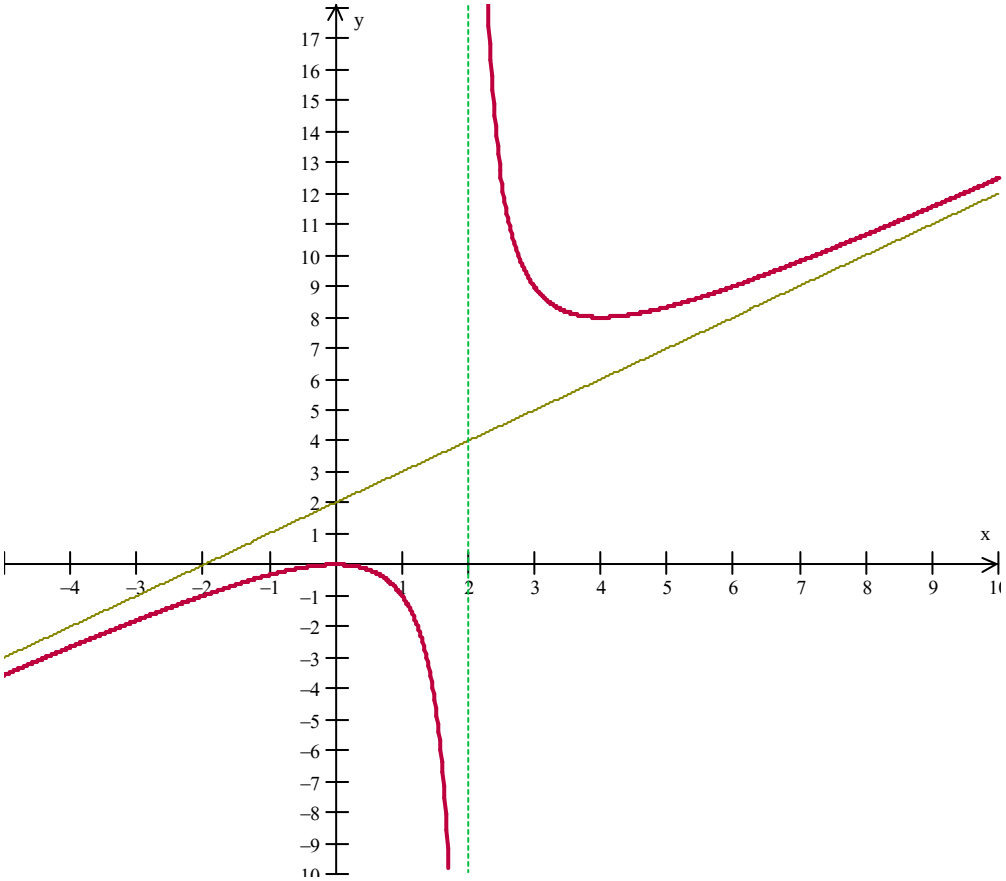
(a) $\displaystyle\int_1^4 \frac{e^{1+\sqrt{x}}\,dx}{\sqrt{x}}$

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

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

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

(e) $\displaystyle\int \frac{1}{1+e^x}\,dx$



$$y = \frac{x^2}{x - 2}$$