

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
Math - 132 Major Exam II
Date: April 26, 2006

Serial #: _____ St. Number: _____ Name: _____ Time: 8:20 – 9:50 pm.

SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERS NOT SUPPORTED BY WORK.

1. (20 points) Consider the function: $f(x) = 1 + x^{\frac{2}{3}}$ Find all vertical and horizontal asymptotes
 - a) Find the critical numbers.
 - b) Find the increasing and decreasing intervals.
 - c) Find the local extrema of $f(x)$.
 - d) Find the concavity intervals and the inflection points if any exists.
 - e) Sketch the graph of the function. **Clearly indicate all important points on the graph**, such as, extrema, inflection points, and intercepts if any such points exist. Also the concavity must be clear.
2. (8 points) If $y'' = 2 + e^x$, find y subject to the initial conditions: $y'(0) = 2$, and $y(0) = 3$.
3. (8 points) Find the slope of the tangent line to the curve $y = x - e^{xy}$ at the point (1,0).
4. (16 points) Find $\frac{dy}{dx}$ for the following functions:
 - a. $y = \log_3 \sqrt{\frac{x+1}{x^3+3x}}$
 - b. $y = (1+2x)^{3x}$.
5. (8 points) A rectangular field is to be enclosed on all sides with a fence. Fencing material costs \$5 per foot for the two sides, and \$6 per foot for the other two sides. Find the maximum area that can be enclosed for \$2400.
6. (8 points) Use differentials to approximate $\sqrt{99}$
7. (8 points) Find the area between the curves: $y = x^2 - 2$ and $y = x + 4$.
8. (24 points) Evaluate the following integrals:
 - a. $\int \left[\frac{1+x+\sqrt{x}}{x^2} \right] dx$
 - b. $\int 2^x (5+3^{-x}) dx$
 - c. $\int_1^e \frac{(1+\ln x) dx}{x}$