PRACTICE EXAM 3 - MATH 112
DATE: Tuesday, November 6
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the intervals of monotonicity and the intervals of concavity of the function $f(x) = x^3 - 6x^2$. (5 points)

2. When a wholesaler sold a certain product at \$40 per unit, sales were 300 units per week. After a price increase of \$5, however, the average number of units sold dropped to 275 per week.

   (a) Find the demand function (price versus number of items) assuming that it is linear. (2 points)

   (b) Find the revenue function. (1 point)

   (c) What price per unit will yield a maximum total revenue? (2 points)

3. Find

   (a) the domain (0.5 points)

   (b) the intercepts (0.5 points)

   (c) the asymptotes (1 point)

   (d) the intervals of monotonicity and the relative extrema (1 point)

   (e) the intervals of concavity and the inflection points (1 point)

   and, then roughly sketch the graph (1 point) of the function $f(x) = \frac{x}{x^2-1}$.

4. Use a small table of 3 values to roughly sketch the graph of the functions

   (a) $f(x) = (\frac{1}{3})^x$ (2 points)

   (b) $g(x) = \log_5 x$ (3 points)

5. How much money should be deposited now in account yielding 6% per year compounded monthly so that the account will have \$20,000 in 10 years time? (5 points)

6. Find the following derivatives:

   (a) $f(x) = 4x^3 e^{-x}$ (2 points)

   (b) $e^{xy} + x^2 - y^2 = 10$ (3 points)