

PRACTICE EXAM 3 - MATH 112

DATE: Friday, March 17

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find

- (a) the domain
- (b) the intercepts
- (c) the asymptotes
- (d) the intervals of monotonicity and the relative extrema
- (e) the intervals of concavity and the inflection points

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

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

- (a) $f(x) = \left(\frac{1}{3}\right)^x$
- (b) $g(x) = \log_5 x$

3. 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?

4. Find the following derivatives:

- (a) $f(x) = 4x^3e^{-x}$
- (b) $e^{xy} + x^2 - y^2 = 10$

5. Find the following derivatives:

- (a) $f(x) = \ln \frac{1+e^x}{1-e^x}$
- (b) $f(x) = 4xy + \ln(x^2y) = 7$

6. Find the equation of the tangent line to the graph of $f(x) = x^2 \ln x$ at the point (e, e^2) .