

EXAM 3 - MATH 112

DATE: Friday, March 23

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

- (a) the domain
- (b) the intercepts (0.5 points)
- (c) the asymptotes (**very carefully**) (0.5 points)
- (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 (2 points) of the function $f(x) = x + \frac{32}{x^2}$.

2. (a) Solve the exponential equation $8^{x^2} = \frac{128}{16^x}$. (3 points)

(b) Use a small table of 3 values to roughly sketch the graph of the function $g(x) = \log_3 x$ (2 points)

3. What should be the interest rate in an account compounding continuously so that a deposit of \$1,000 now would yield \$10,000 in 20 years time? (5 points)

4. Find the following derivatives:

(a) $f(x) = \frac{e^{5x}}{x^2+7}$ (2 points)

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

5. Find the following derivatives:

(a) $f(x) = \ln \frac{\sqrt[3]{4+x^2}}{x(x^2+7)}$ (2 points)

(b) $4x^3 + \ln(y^2) + 2xy = 2x$ (3 points)

6. Find the equation of the tangent line to the graph of $f(x) = (e^{4x} - 2)^2$ at the point $(0, 1)$. (5 points)