

EXAM 2 - MATH 112

DATE: Friday, February 18

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 the equation of the tangent line to the graph of $y^3 - 2x^2y + 3xy^2 = -1$ at the point $(0, -1)$.
2. A point is moving along the graph of $y = \frac{1}{1+x^2}$ so that $\frac{dx}{dt}$ is 2 centimeters per minute. Find $\frac{dy}{dt}$ when $x = 2$.
3. Find the absolute min and the absolute max of the function $f(x) = x^2 - 8x + 10$ in the interval $[0, 7]$.
4. Do a complete study (monotonicity, extrema, concavity, inflection points and graph) of the function $f(x) = x^3 + 6x^2$.
5. A rectangular page is to contain 30 square inches of print. The margins at the top and bottom of the page are to be 2 inches wide. The margins on each side are to be 1 inch wide. Find the dimensions of the page such that the least amount of paper is used.
6. Perform the following steps in the order given: Find the domain, the intercepts, create the sign table for $f(x)$, $f'(x)$ and for $f''(x)$, find the asymptotes and roughly sketch the graph of $f(x) = \frac{x^2+1}{x^2-2}$.