EXAM 2 - MATH 112

DATE: Tuesday, October 11 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 $xy^2 4y = 1$ at the point (5,1).
- 2. A small 10-foot ladder is leaning against the wall of a house. The base of the ladder is pulled away from the house at a rate of 1 foot per second. How fast is the top of the ladder moving down the wall when the base of the ladder is 6 feet from the house?
- 3. Find the absolute extrema of the function $f(x) = \frac{x^2}{x^2+3}$ in the closed interval [-1,3].
- 4. Study the polynomial function $f(x) = -x^3 + 3x^2 + 9x 27$. (Studying means find domain, find intercepts, find intervals of monotonicity and relative extrema, find intervals of concavity and inflection points and roughly sketch the graph. Do all these step-by-step.)
- 5. The combined perimeter of an equilateral triangle and a square is 10 feet. Find the dimensions of the triangle and the square that produce a minimum total area.
- 6. Study the rational function $f(x) = \frac{x^2+1}{x^2-2}$. (Study means find domain, find intercepts, find asymptotes, find intervals of monotonicity and relative extrema, find intervals of concavity and inflection points and roughly sketch the graph. Do all these step-by-step.)