## PRACTICE 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  $x^3 + y^3 = 2xy$  at the point (1, 1).
- 2. Consider a spherical balloon that is being inflated in such a way that its radius increases at a rate of 1.5 inches per minute. Find the rate at which the surface area is increasing when the radius is exactly 6 inches. (The formula that gives the surface area S of a sphere in terms of its radius r is  $S = 4\pi r^2$ .)
- 3. Find the absolute min and the absolute max of the function  $f(x) = x^3 12x$ in the interval [0, 4].
- 4. Do a complete study (monotonicity, extrema, concavity, inflection points and graph) of the function  $f(x) = -x^3 + 3x^2 2$ .
- 5. The difference of two numbers is 50. Find the two numbers so that their product is a minimum.
- 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  $f(x) = \frac{2x}{1-x^2}$ .