PRACTICE 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 equations of the tangent line to the graph of $\sqrt{xy} = x - 2y$ at the point $(4, 1)$.

2. An accident at an oil drilling platform is causing a circular oil slick. The slick is 0.08 foot thick and, when the radius is 750 feet, the radius of the slick is increasing at a rate of 0.5 foot per minute. At what rate (in cubic feet per minute) is oil flowing from the site of the accident?

3. Find the absolute extrema of the function $f(x) = 4\sqrt{x} - 2x + 1$ in the closed interval $[0, 6]$.

4. Study the polynomial function $f(x) = (x - 2)^3(x - 1)$. (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. Suppose that the demand function of a product is given by $p = \frac{40}{\sqrt{x}}$, where p is price per item when x items are sold. If the cost function for the same product is given by $C(x) = 2x + 50$, find the price p that will maximize the profit of the company that produces this product.

6. Study the rational function $f(x) = \frac{x^2 - 2}{x^2 - x - 2}$. (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.)