PRACTICE EXAM 2 - MATH 112

DATE: Friday, February 20
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 derivative of the function
   (a) $f(x) = (x^2 + 1)(x^7 - 3x + 1)$
   (b) $f(x) = \frac{x^2+1}{6x^3-3}$
   (c) $f(x) = (2x + 5)^{13}$
   (d) $f(x) = \sqrt{x^2 + 7x - 1}$
2. Find the equation of the tangent line to the graph of $f(x) = 2x^3 - 50x$ at the point $x = 1$.
3. Find $\frac{dy}{dx}$ by implicit differentiation and evaluate the derivative at the point $(1, 1)$ if $x^2y + 3xy^3 - x = 3$.
4. Oil spilled from a tanker spreads in a circular pattern whose radius increases at the rate of 2 ft/sec. How fast is the area of the spill increasing when the radius is 60 ft?
5. Find the domain, the x- and y-intercepts, the intervals of monotonicity, the relative extrema, the intervals of concavity, the inflection points and then roughly sketch the graph of the function $f(x) = -(x + 2)(x - 1)(x - 5)$.
6. Find the domain, the x- and y-intercepts, the horizontal and vertical asymptotes, the intervals of monotonicity, the relative extrema, the intervals of concavity, the inflection points and then roughly sketch the graph of the function $f(x) = \frac{3x+5}{2x-1}$.