

EXAM 2 - MATH 112

DATE: Friday, February 17

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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. Compute the derivatives of the following functions:

(a) $f(x) = (x^2 - x + 2)(x^5 + 4)$

(b) $g(x) = \frac{x^5 - x^3 + 5}{x^2 + 7}$

2. Find the equation of the tangent line to the graph of $f(x) = \sqrt[5]{(5x+2)^3}$ at $x = 6$.
3. Find the equation of the tangent line to the graph of $\sqrt{xy} = x - 2y$ at $(4, 1)$.
4. Suppose that the radius of a sphere is increasing at a rate of 2 inches per minute when the radius is 6 inches. Find the rate at which the surface area of the sphere is increasing when the radius is 6 inches. (The formula giving the surface area S of a sphere in terms of its radius r is $S = 4\pi r^2$.)
5. Find the intervals of monotonicity and the intervals of concavity of the function $f(x) = x^3 - 6x^2$.
6. A dairy farmer plans to enclose a rectangular pasture adjacent to a river. To provide enough grass for the herd, the pasture must contain 180,000 square meters. No fencing is required along the river. What dimensions will use the smallest amount of fencing?