

Mathematics I

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Exam 1

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1. Find the derivatives of the following functions.

a) $y = (2x^5 - x^2)\sin^3(x^6 + 1)$

b) $y = \frac{x^3 + 4x^2 - 13}{\cos x^2}$

2. Find the equation of the tangent line at the point $(2, -1)$ for the curve $4x^2 - xy^2 + 7y^3 = 7$.

3. Sketch the curve $y = x^3 - 3x^2 - 9x + 2$ by finding the interval where it is increasing or decreasing, and where it concaves up or down.

4. Find the point on the curve $y^2 = x$ between $0 \leq x \leq 2$ which is

a) nearest to $(1,0)$

b) farthest away from $(1,0)$