

MULTIVARIABLE CALCULUS MATH 2D

(Sample) Final Exam

Problem 1.

Find the equation of the plane through the line of intersection of the planes $x - z = 1$ and $y + 2z = 3$ and perpendicular to the plane $x + y - 2z = 1$.

Problem 2.

Find the curvature of the ellipse $x = 3 \cos t$, $y = 4 \sin t$ at the points $(3, 0)$ and $(0, 4)$.

Problem 3.

Find the absolute maximum and minimum values of the function $f(x, y) = 4xy^2 - x^2y^2 - xy^3$ on the set $D = \{(x, y) \mid x \geq 0, y \geq 0, x + y \leq 6\}$.

Problem 4.

Find the volume of the solid above the paraboloid $z = x^2 + y^2$ and below the half-cone $z = \sqrt{x^2 + y^2}$.

Problem 5.

Evaluate

$$\int_0^3 \int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}} (x^2 + y^2 + \sin(\pi(x^2 + y^2))) dy dx$$