

Math 250B Test One
Section X02

Time: 50 Minutes
Total: 20 Marks

Name: _____

1. [5 marks] Find the equation of the tangent plane to $z = 4 \ln(x^2 + 2) + 9x \sin(2y)$ at the point $(x, y) = (1, \pi)$.

2. [4 marks] Use differentials to approximate $f(a + 0.5, b - 0.2)$ given $f(x, y) = 4(\sqrt{x^2 + y^2})$ and $f(a, b) = c$. Your answer will involve a, b , and c .

3. [5 marks] Use the Multivariable Chain Rule to find z_b evaluated at $(a, b) = (1, 2)$ given:

$$z = 2s^2 - 3s^3t^2 + 4t^2 + \frac{4b^3}{a}, \quad s = a^2 - 3b, \quad t = 2ab.$$

4. [6 marks] Find the absolute maximum of $z = x^4y^2$ over the region $x^2 + y^2 \leq 1$. Give the absolute maximum value and all points (x, y) where it is achieved.