

Math 250B Test One
Section X01

Time: 50 Minutes
Total: 25 Marks

Name: _____

1. [3 marks] State whether the surface is a cone, cylinder, paraboloid, plane or sphere:

a) $y = x^2 + z^2$

b) $z = 7 - \sqrt{x^2 + y^2}$

c) $y^2 + z^2 = 9$

2. [5 marks] Find all points where the tangent plane to the surface is horizontal. Give your answer(s) in the form (x, y) .

$$z = 2x^4 - 8x^3 + 8x^2 + y^3 - 3y^2$$

3. [6 marks] Use the Multivariable Chain Rule to find w_b at $(a, b) = (0, 0)$ given:

$$w = e^{x^2y} + \ln(xy + 6), \quad x = 1 + \sin(2a + 3b), \quad y = 4 + \cos(\pi - a - 6b).$$

4. [5 marks] Let $f = \frac{3(\sqrt{x})}{y^7}$

The maximum relative error in x is $\pm 6\%$.

The maximum relative error in y is $\pm 2\%$.

Estimate the maximum relative error in f .

5. [6 marks] Find the absolute maximum of $z = x^4y^2$ over the region $x^2 + y^2 \leq 6$. Give the absolute maximum value and all points (x, y) where it is achieved.