

Written HW5 – MATH 3503 Fall 2022

Recall that if $z = f(x, y)$ describes some surface, then the tangent plane to the surface at (x_0, y_0, z_0) , where $z_0 = f(x_0, y_0)$ is given by the plane

$$z - z_0 = f_x(x_0, y_0)(x - x_0) + f_y(x_0, y_0)(y - y_0).$$

Use this fact to find tangent planes to the surfaces described below at the given point. Include a picture of the surface, the point, and the tangent plane.

1. $z = \ln(10x^2 + 2y^2 + 1)$ at $(0, 0, 0)$
2. $z = \sin(x) + \sin(y) + \sin(x + y)$ at $(\pi, \pi, 0)$
3. $xy + yz + zx = 11$ at $(1, 2, 3)$