Worksheet #25

(1) Find the equation of the tangent plane and the normal line to the surface $x + y + z = e^{xyz}$ at (0, 0, 1).

(2) Find the directional derivative of $f(x,y) = e^x \sin y$ at $P(0,\pi/4)$ in the direction of $\mathbf{a} = <1, \sqrt{3} >.$

(3) Find a unit vector in the direction in which $f(x, y, z) = x^2 y z$ increases most rapidly at P(1, -1, 2).

(4) The elevation of a mountain above sea level at (x, y) is $3000e^{-(x^2+2y^2)/100}$ meters. The positive x-axis points east and the positive y-axis points north. A climber is directly above (10, 10). If the climber moves northwest, will she ascend or descend and at what slope?