Calculus II Quiz 4 110/05/17

1. (5 points) Find equation of tangent plane to the surface $ye^{-x}\sin z = 1$ at point $(0,1,\frac{\pi}{2})$.

2. (5 points) Find the directional derivative of $f(x,y,z) = \cos \pi xyz$ at point $(1,\frac{1}{3},\frac{1}{2})$ in the direction in which *f* decreases most rapidly.

3. (16 points) For the function $f(x,y) = 2x^3 - 6xy + 3y^2$.

   (a) Find all local extreme and saddle point(s) of f.

   (b) Find absolute extreme values of f on the triangle with vertices $(0,0),(0,2),(2,0)$.

4.(12 points) Find all local extreme and saddle point(s) of $f(x,y,z) = xyz - (x^2 + y^2 + z^2)$.

5. (12 points) Find absolute extreme values of function $f(x,y,z) = xy + 2z$ on the circle $\begin{cases} x + y + z = 0 \\ x^2 + y^2 + z^2 = 24 \end{cases}$.