HW 3, due on Tuesday (08/01/17)

Remark. Questions in exams will be similar to questions in homework.

1. Find the equation of the tangent plane to the surface

\[ z = 1 - \frac{1}{10} (x^2 + 4y^2) \]

at the point \((1, 1, \frac{1}{2})\).

2. Find relative extrema and saddle points for the following functions.

\[ f(x, y) = -x^2 - 4y^2 + 8x - 8y - 11 \]

\[ f(x, y) = xy + \frac{1}{x} + \frac{1}{y}. \]

3. Assume that \(x > 0\) and \(y > 0\), find the maximum of

\[ f(x, y) = 2x + 3xy + y \]

with

\[ x + 2y = 29. \]

4. Assume that \(x > 0\) and \(y > 0\), find the minimum of

\[ f(x, y) = 3x^2 - y^2 \]

with

\[ 2x - 2y + 5 = 0. \]