

MATHEMATICS II
Monday May 8
Eleventh Exercise Class

1

Find the local maximum and minimum values and saddle points of the following functions.

$$(1) \quad f(x, y) = xy + \frac{1}{x} + \frac{1}{y}.$$

$$(2) \quad f(x, y) = (x^2 + y^2)e^{y^2 - x^2}.$$

$$(3) \quad f(x, y, z) = -x^2 - y^2 - z^2 + xy - yz + x + y.$$

$$(4) \quad f(x, y, z) = \ln(x^2 + y^2 + z^2 + 1).$$

2

Find the extreme values of the following functions subject to the given constraints.

$$(5) \quad f(x, y) = x^2 + y^2, \quad xy = 1.$$

$$(6) \quad f(x, y) = x^2y, \quad x^2 + 2y^2 = 6.$$

$$(7) \quad f(x, y, z) = xyz, \quad x^2 + 2y^2 + 3z^2 = 6.$$

$$(8) \quad f(x, y, z) = x^2 + 2y^2 + 3z^2, \quad x + y + z = 1, \quad x - y + 2z = 2.$$