Worksheet 02

MATH 16B GSI:TAO SU TU 09/05/2017

1. Find all points (x, y)(or (x, y, z)) where $f(x, y)$ (or $f(x, y, z)$) has a possible relative minimum or maximum.
(a) $f(x, y) = x^3 + y^2 - 3x + 6y$
(b) $f(x, y) = ye^x - 3x - y + 5$
(c) $f(x, y, z) = 2x^2 + 3y^2 + z^2 - 2x - y - z$

2. Both first partial derivatives of the following functions $f(x, y)$ are zero at the given points. Use the second-derivative test to determine the nature of $f(x, y)$ at each point (relative minimum/maximum, neither minimum nor maximum, inconclusive).
(a)$f(x, y) = x^2 - 2xy + 4y^2$; $(0, 0)$
(b)$f(x, y) = 2x^2 - x^4 - y^2$; $(-1, 0), (0, 0), (1, 0)$
(c)$f(x, y) = x^3 + y^3$;$(0, 0)$