Problem Set 1

MATH 16B Spring 2016

4 February 2015

Exercise (7.1.5)**.** Let $f(x, y) = xy$. Show that $f(2 + h, 3) - f(2, 3) = 3h$.

Exercise (7.2.20)**.** Let $f(x, y) = (x + y^2)^3$. Evaluate $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ at $(x, y) = (1, 2)$.

Exercise (7.2.24)**.** Let $f(x, y) = xe^y + x^4y + y^3$. Find $\frac{\partial^2 f}{\partial x^2}$, $\frac{\partial^2 f}{\partial y^2}$, $\frac{\partial^2 f}{\partial x \partial y}$, and $\frac{\partial^2 f}{\partial y \partial x}$.

Exercise (7.3.7)**.** Find all points (x, y) where $f(x, y) = \frac{1}{3}x^3 - 2y^3 - 5x + 6y - 5$ has a possible relative maximum or minimum.

Exercise (7.3.23)**.** Find all points (x, y) where $f(x, y) = x^3 - y^2 - 3x + 4y$ has a possible relative maximum or minimum. Then use the second derivative test at each point to determine, if possible, whether f has a maximum, minimum, or neither.