Math 105 91A[1] January 10th, 19100 Worksheet 1
http://www.math.ubc.ca/~ athreya/105

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1. Sketch the following curves:

   (a) $z = x$

   (b) $z = x^2 - y^2$

   (c) $z = x^2 + y^2$

2. Describe the level sets of the curve (1a) at $z = 10, z = 20, z = 30$ and the level sets of the curve (1c) at $z = 625, z = 169$.

3. Let $f(x, y) = 16x + 17y - 3$. Find f_x and f_y. Can you geomertically describe the surface $z = f(x, y)$?.

4. Let $f(x, y) = x^2 + y^2 + 2xy + 6x + 2y - 1$.

   (a) Find f_x and f_y.

   (b) Find the set of all (a, b) such that $f_x(a, b) = f_y(a, b) = 0$. Describe what is happening geometrically at such an (a, b).

5. Find all the first order partial derivatives the following functions:

   (a) $f(x, y) = x\sqrt{1 + x + 3y^2}$

   (b) $f(r, \theta, z) = \frac{r(2-\cos(2\theta))}{r^2+z^2}$

   (c) $f(s, t) = \arcsin(\frac{s}{t}) = \sin^{-1}(\frac{s}{t})$

[1] **Office hours:** Monday:2:30-3:30pm, Tuesday:3:30-4:30 pm, Wednesday: 10:30-11:30 am