EXERCISES #10

FUNCTIONS OF SEVERAL VARIABLES

Exercise 1. Find the values of the following functions.
    (1) $f(2,5)$ for $f(x,y) = x^2 y^2 - \frac{x}{y}$.
    (2) $f(\frac{\pi}{2}, \frac{\pi}{3})$ for $f(x,y) = x \sin y + y \sin x$.
    (3) $f(0, \pi, 1)$ for $f(x,y,z) = x^2 y^3 z - x e^z + z \sin y$.

Exercise 2. Find and sketch the domain of the following functions.
    (1) $f(x,y) = \ln(x + 2y)$
    (2) $f(x,y) = \frac{1}{x+y}$
    (3) $f(x,y) = \sqrt{x^2 - y^2}$
    (4) $f(x,y) = \frac{1}{\sqrt{x - \sin y}}$

Exercise 3. Sketch the graph of the following functions. Draw some of their horizontal traces.
    (1) $f(x,y) = x^2$
    (2) $f(x,y) = -1 - x^2 - y^2$
    (3) $f(x,y) = xy$
    (4) The implicit equation $x^2 + y^2 + 4z^2 = 1$ (with z as an implicit function of x, y).

Exercise 4. Sketch the contour map of the following functions.
    (1) $f(x,y) = y e^{-x}$
    (2) $f(x,y) = x^2 + 4y^2$