3-1 Videos Guide

3-1a

- Introduction to multivariable functions
  - Domain
  - Graphs

Exercises:

- The *temperature-humidity index* I (or humidex, for short) is the perceived air temperature when the actual temperature is *T* and the relative humidity is h, so we can write $I = f(T, h)$. The following table of values of I is an excerpt from a table compiled by the National Oceanic & Atmospheric Administration. Using the table, find $f(95, 70)$. What is the meaning of $f(80, h)$?

Relative humidity (%)

Actual Temperature (°F) T \ h	20	30	40	50	60	70
80	77	78	79	81	82	83
85	82	84	86	88	90	93
90	87	90	93	96	100	106
95	93	96	101	107	114	124
100	99	104	110	120	132	144

- Let $F(x, y) = 1 + \sqrt{4 - y^2}$.
  (a) Evaluate $F(3, 1)$.
  (b) Find and sketch the domain of F.
  (c) Find the range of F.

3-1b

- Let $g(x, y, z) = x^3 y^2 z \sqrt{10 - x - y - z}$.
  Find and describe the domain of g.
- Find and sketch the domain of the function.
  - $f(x, y) = \sqrt[4]{x - 3y}$
  - $g(x, y) = \frac{\ln(2-x)}{1-x^2-y^2}$

3-1c

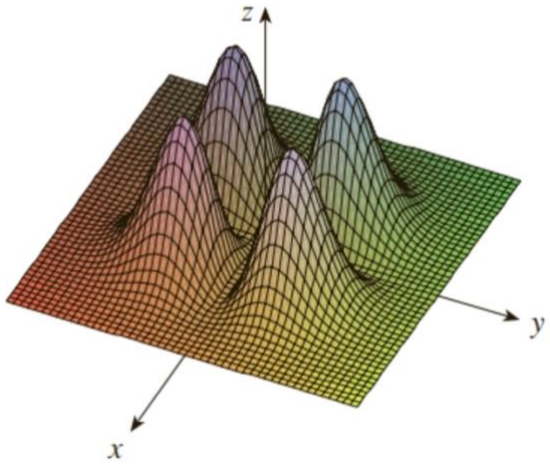
- Find and sketch the domain of the function.
  $f(x, y, z) = \ln(16 - 4x^2 - 4y^2 - z^2)$
- Sketch the graph of the function.
  $f(x, y) = 2 - x^2 - y^2$

3-1d

- Level curves and contour maps

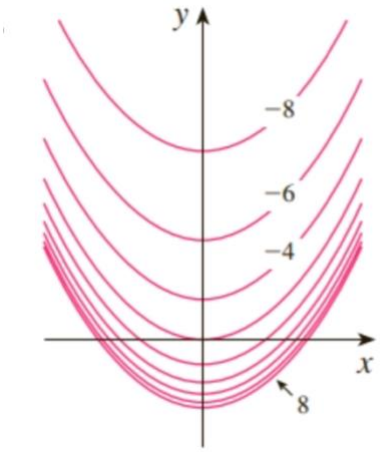
Exercises:

- Make a rough sketch of a contour map for the function whose graph is shown.



3-1e

- A contour map of a function is shown. Use it to make a rough sketch of the graph of g.



- Draw a contour map of the function $f(x, y) = xy$ showing several level curves.