University of Toronto at Scarborough
Department of Computer & Mathematical Sciences

MATA33S **Assignment 6 (Enhanced)** **Winter 2018**

This **enhanced** Assignment (and enhanced Solutions) 6 are courtesy of Professor Moore (who has taught MATA33 with Professor Grinnell several times). Some of the problems below are taken from our textbook and others are not. The solutions contain computer generated graphics and detailed explanations that will help you understand (and appreciate) graphs of functions of two variables and level curves.

The instructions and end notes for this Enhanced Assignment 6 are the same as for the Regular Assignment 6.

Study: Sections 2.8 and 17.1 for this assignment. Read ahead in Sections 17.2 and 17.3.

Problems:

1. Section 2.8 # 1 - 21, 23, 25 - 28.
2. Section 17.1 # 1, 2, 4 - 13, 15 - 17, 19 - 23, 27 - 31, 35 - 38.
3. Find and sketch the domain of the following functions:
   (a) $f(x,y) = ln(x+y-1)$
   (b) $f(x,y) = e^{3xy}$
   (c) $f(x,y) = \sqrt{x+y}$
   (d) $f(x,y) = ln(9-x^2-9y^2)$
   (e) $f(x,y) = \sqrt{1-x^2} - \sqrt{1-y^2}$
   (f) $f(x,y) = \dfrac{\sqrt{y-x^2}}{1-x^2}$
4. For each of the following functions $z = f(x,y)$ draw on the same set of axis the five labeled level curves $c = -2,\ -1,\ 0,\ 1,\ 2$. If it turns out that some of these level curves cannot be drawn, explain why not. Describe in words both the level curves and what you think the graph of the function looks like.
   (a) $f(x,y) = x+y$
   (b) $f(x,y) = x^2+y^2$
   (c) $f(x,y) = xy$
   (d) $f(x,y) = y-x^2$
   (e) $f(x,y) = x^2+2y^2$