MATE 3063 assignment 3: section 14.3

On your own, do exercises 1–8. Hand in:

1.   Exercise 9. The explanation must be complete. Hint: consider the trace of each surface with the two planes $x = 3$ and $y = -1.5$. Then use known facts about the correspondence between the variation of a function of a single variable, and the variation of its derivative (variation means: sign? does it increase or decrease?). In particular, the derivative at an extremum is 0, the derivative of a linear function is constant, the derivative of a concave function is decreasing.

2.   Exercise 10. Your solution must include the plot.

3.   Find the first partial derivatives of the function:

   (a) $f(x, y) = x^3 - 5xy^2$.

   (b) $f(t, x) = \sqrt{3x + 4t}$.

   (c) $f(x, y) = \dfrac{x}{(x + y)^2}$.

   (d) $u(r, \theta) = \cos(r \sin \theta)$.

4.   Find the first partial derivatives:

   (a) $g(x, y) = y^{-x}$. Find and shade the domain of this function.

   (b) $g(x, y) = \int_x^y \sin(e^t)\, dt$.

   (c) $u = \sqrt{x_1^2 + x_2^2 + \cdots + x_n^2}$.

   (d) $w = \sin(x_1 + 2x_2 + \cdots + nx_n)$.

5.   Choose one of exercises 41–44.

6.   Choose one of 47–50.

7(a-b).   Exercises 51, 52.

8(a-b).   Choose two of 53–58.

9(a-b).   Choose two of 63–70.

10(a-b). Exercises 71, 72.

11.   Exercises 73. Include the table.

12.   Exercise 74. Include the plot and explain your choice.

13.   Exercise 77.

14.   Choose one of 82, 83, 90.