MATE 6540 assignment 8

26. Exercise 2, p. 123 of Gamelin-Greene.

27. Exercise 3, p. 123 of Gamelin-Greene.

28. The set of all nonsingular $k \times k$ matrices, regarded as a subset of R^{k^2}, forms a smooth manifold. What is its dimension? How many connected components does it have?

29. Let X be the cone of revolution $x_3^2 = x_1^2 + x_2^2$ in R^3. Show that X is not a smooth manifold (consider the connected components of $V \setminus \{x\}$, where V is an open neighbourhood of a point $x \in X$).

Marks: 6 + 9 + 6 + 6