Homework 8

Exercises on regular surfaces :

1. Show that the following subsets of $\mathbb{R}^3$ are regular surfaces. (i) Find surface patches covering the set. (ii) Make sure the surface patches are allowable.)

(i) $S: x^2 + y^2 - z^2 = 1$

(ii) $S: x^2 + 4y^2 = 4$

(iii) $S: y^2 + z^2 = 1$

(iv) $S: z = x^2 + 2y^2$

(v) $S: y = \sin x$

2. Consider the following curves in the xy-plane. Revolve them in $\mathbb{R}^3$ about the x-axis and show that we get regular surfaces in this way.

(i) $y = 1 + x^2$

(ii) $y = e^x$

(iii) $y = 1/x$