## Cylinders and Quadric Surfaces

**Problem 1** (Stewart, Exercises 12.6.(5,6,8)). Sketch the following surfaces.

(1)  $z = 1 - y^2;$ (2)  $x = z^2;$ (3)  $z = \sin y.$ 

**Problem 2** (Stewart, Exercises 12.6.(11,12,15,18,20)). Sketch and identify the surfaces.

(1)  $x = y^2 + 4z^2;$ (2)  $4x^2 + 9y^2 + 9z^2 = 36;$ (3)  $9y^2 + 4z^2 = x^2 + 36;$ (4)  $3x^2 - y^2 + 3z^2 = 0;$ (5)  $x = y^2 - z^2.$ 

**Problem 3** (Stewart, Exercise 12.6.43). Sketch the region bounded by the surfaces  $z = \sqrt{x^2 + y^2}$  and  $x^2 + y^2 = 1$  for  $1 \le z \le 2$ .

**Problem 4** (Stewart, Exercise 12.6.47). Find the equation of the surface consisting of all points that are equidistant from the point (-1, 0, 0) and the plane x = 1. Identify the surface.

**Problem 5** (Stewart, Exercise 12.6.48). Find the equation of the surface consisting of all points P for which the distance from P to the x-axis is twice the distance from P to the yz-plane. Identify the surface.

## References

[1] J. Stewart: Calculus 8th Edition, Cengage Learning, Boston 2016.