

MATE 3063 assignment 1: section 12.6

For the numbering of the problems as you present them, refer to the posted instructions.

1. Exercise 9 p.839.
2. Choose four from 21–28 (see below).
3. Use traces to sketch and identify the surface:
 - (a) $y^2 = x^2 + 4z^2$.
 - (b) $x^2 + 9y^2 + 9z^2 = 9$.
 - (c) $x = y^2 - z^2$.
4. Reduce the equation to one of the standard forms, classify the surface, and sketch it:
 - (a) $x^2 - 4x - 2y^2 - z^2 = 0$.
 - (b) $4x^2 + 9y^2 + z = 1$.
5. Given the point of coordinates (x_0, y_0, z_0) ,
 - (a) Find its distance to the xz -plane.
 - (b) Find its distance to the y -axis.

Plot in both cases.

6–9. Exercises 43, 45, 47, 52 of this section.

Problem 2: “Give reasons for your choice”. The reasons have to be compelling, and proceed by elimination. Two examples on how the solution should read:

(22 of text):

$9x^2 + 4y^2 + z^2 = 1$. This set is bounded, and the only bounded sets among those shown are iv and vii. In the given set (ellipsoid), the largest intercept is with the z -axis. This eliminates figure vii, where the largest intercept is with the x -axis. So this leaves iv.

(24 of text):

$-x^2 + y^2 - z^2 = 1$. The equation is written in a more symmetric fashion:

$$y^2 = 1 + x^2 + z^2.$$

From the table, this is the standard form of a (circular) hyperboloid of 2 sheets, symmetric about the y -axis. The only match is fig. iii.