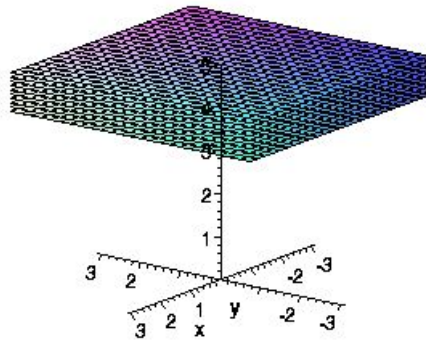


1. Fully describe in words the 3-dimensional region represented by the equation or inequality.

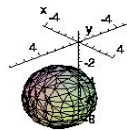
(a)  $z > 4$

This region is the half-plane that is above (and not including) the plane  $z=4$ , which is the plane parallel to and 4 units above the  $xy$  - plane



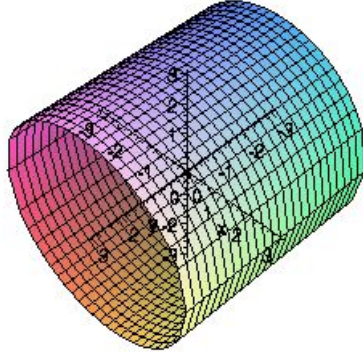
(b)  $(x - 2)^2 + y^2 + (z + 5)^2 = 9$

This is a sphere of radius 3 units centered at  $(2, 0, -5)$ .



(c)  $y^2 + z^2 = 9$

This is a circular cylinder with radius 3 units. It wraps around the  $x$ -axis and extends infinitely.



2. Find the distance from the point  $(-2, 3, 4)$  to each of the following:

(a) The  $yz$  - plane.

This is the same as asking how far out the point is in the positive or negative  $x$  - direction. So the distance is the absolute value of the  $x$  - coordinate, in this case that is 2 units.

Another way to complete this problem is to realize that the point on the  $yz$  - plane that is closest to the given point is  $(0, 3, 4)$ . you can then compute the distance between the two points, which is 2 units.

(b) The  $z$  - axis.

The point on the  $z$  - axis that is closest to the given point is  $(0, 0, 4)$ . We use the distance formula:

$$d = \sqrt{(-2 - 0)^2 + (3 - 0)^2 + (4 - 4)^2} = \sqrt{13}\text{units.}$$