

## Homework Section 12.1

- Plot the points  $(4, 0, 3)$ ,  $(3, 2, 5)$ ,  $(5, -4, -1)$ , and  $(-3, 5, -2)$  together in  $R^3$  on the same set of axes.
- Sketch the following planes in  $R^3$  (graph each separately):
  - $y = 2x + 1$ .
  - $y = 2$
  - $z = 3$
  - $2x + 3y + z = 6$
- Provide a written description of the given region in  $R^3$ .
  - $z > 5$
  - $0 < z \leq 5$
  - $x^2 + y^2 + z^2 > 4$
- Find the distance between the points  $(1, -3, -4)$  and  $(-7, -5, 2)$ .
- Find the equation of a sphere with center  $(-5, 6, -8)$  and radius 7. What kind of geometric object is formed by the intersection of this sphere with the  $yz$ -plane? Find the equations that represent the intersection of the sphere with  $yz$ -plane.
- Find the equation of a sphere that goes through  $(1, -3, -4)$  with center  $(-7, -5, 2)$ . Use your work from number 4.
- Sketch one period of the curve given by  $y = \sin x$  in the  $xy$ -plane.
  - Sketch one period of the cylinder given by  $y = \sin x$  in  $R^3$ .
  - Sketch one period of the cylinder given by  $z = \sin x$  in  $R^3$ .
- Sketch the cylinders:
  - $z = e^y$
  - $\frac{x^2}{4} + \frac{y^2}{9} = 1$