

- 1) Convert the point from cylindrical coordinates to rectangular coordinates.
 - a) $(-7, 0, 5)$
 - b) $\left(6, -\frac{\pi}{4}, 2\right)$

- 2) Convert the point from rectangular coordinates to cylindrical coordinates.
 - a) $(0, 5, 1)$
 - b) $(2\sqrt{2}, -2\sqrt{2}, 4)$

- 3) Find an equation in cylindrical coordinates for the equation given in rectangular coordinates.
 - a) $z = 3$
 - b) $x = 9$
 - c) $x^2 + y^2 + z^2 = 17$
 - d) $y = x^2$

4) Find an equation in rectangular coordinates for the equation given in cylindrical coordinates.

a) $r = 3$

b) $z = 2$

a) $\theta = \frac{\pi}{6}$

b) $r = 2 \cos \theta$

5) Convert the point from rectangular coordinates to spherical coordinates.

a) $(4, 0, 0)$

b) $(-1, 2, 1)$

6) Convert the point from spherical coordinates to rectangular coordinates.

a) $\left(4, \frac{\pi}{6}, \frac{\pi}{4}\right)$

b) $\left(6, \pi, \frac{\pi}{2}\right)$

7) Find an equation in spherical coordinates for the equation given in rectangular coordinates.

a) $y = 2$

b) $z = 6$

c) $x^2 + y^2 + z^2 = 49$

d) $x^2 + y^2 = 2z^2$

8) Find an equation in rectangular coordinates for the equation given in spherical coordinates.

a) $\rho = 5$

b) $\theta = \frac{3\pi}{4}$

c) $\phi = \frac{\pi}{6}$

d) $\rho = 4 \csc \phi \sec \theta$

9) Convert the point from cylindrical coordinates to spherical coordinates.

a) $\left(4, \frac{\pi}{4}, 0\right)$

b) $\left(2, \frac{2\pi}{3}, -2\right)$

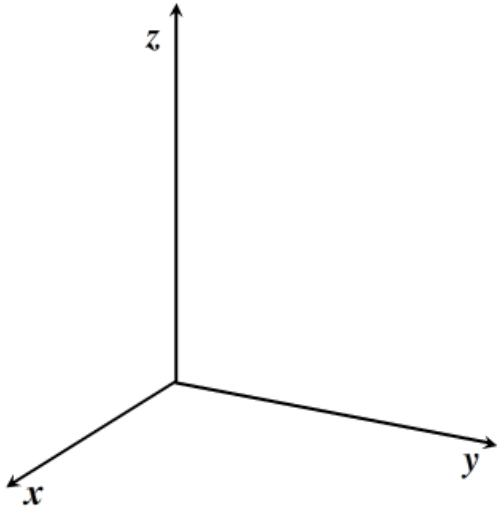
10) Convert the point from spherical coordinates to cylindrical coordinates.

a) $\left(10, \frac{\pi}{6}, \frac{\pi}{2}\right)$

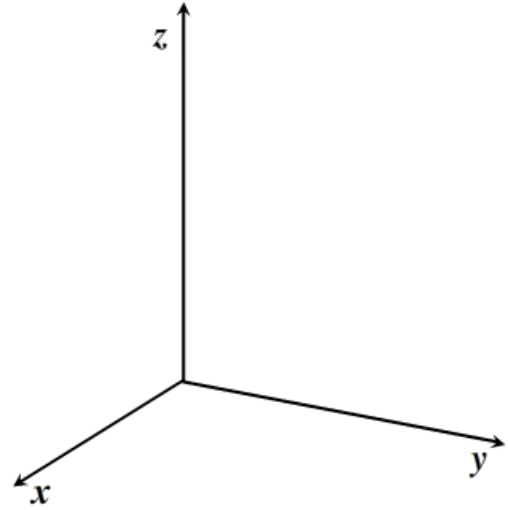
b) $\left(18, \frac{\pi}{3}, \frac{\pi}{3}\right)$

11) Sketch the graph described by the given inequalities.

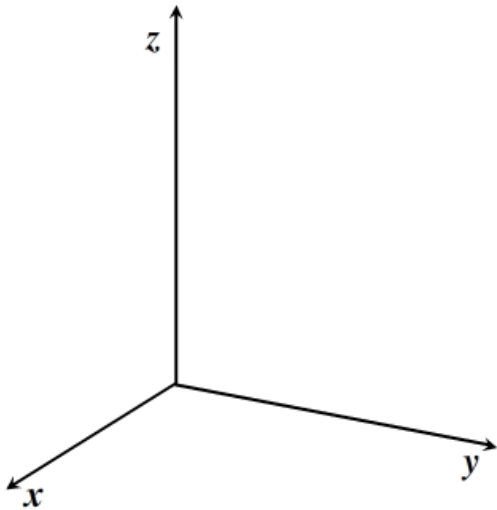
$$r^2 \leq z \leq 2 - r^2$$



$$0 \leq \theta \leq \frac{\pi}{2}, \quad r \leq z \leq 2$$



$$\rho \leq 2, \quad 0 \leq \phi \leq \frac{\pi}{2}, \quad 0 \leq \theta \leq \frac{\pi}{2}$$



$$\rho \leq 2, \quad 0 \leq \phi \leq \frac{\pi}{3}$$

