

9.7 Cylindrical and Spherical Coordinates

Polar Coordinates

Cylindrical Coordinates

Example 1

- a) Plot the point with cylindrical coordinates $\left(2, \frac{2\pi}{3}, -2\right)$ and then find its rectangular coordinates.
- b) Find the cylindrical coordinates for the point with rectangular coordinates $(2, -1, 3)$

Shapes with nice Cylindrical Coordinate Form

Example 2

Find an equation in cylindrical coordinates for $z = x^2 + y^2$.

Spherical Coordinates

Example 3

- a) Plot the point with spherical coordinates $\left(2, \frac{5\pi}{6}, \frac{2\pi}{3}\right)$ and then find its rectangular coordinates.
- b) Find the spherical coordinates for the point with rectangular coordinates $(2, -1, 3)$

Shapes with nice Spherical Coordinate equations

Example 4

Find an equation in spherical coordinates for $x^2 - y^2 - z^2 = 1$.

Example 5

Find an equation in rectangular coordinates for $\rho = \sin \theta \sin \phi$

HW 9.7 # 1, 3, 5, 7, 9, 11, 13, 15, 19, 23, 31