

Worksheet on Polar, Cylindrical and Spherical Coordinates

1. Plot the following polar points.

(a) $\left(2, \frac{\pi}{6}\right)$ (b) $\left(3, \frac{5\pi}{6}\right)$ (c) $\left(-2, \frac{\pi}{3}\right)$ (d) $\left(2, -\frac{\pi}{3}\right)$

2. Convert the following rectangular points to polar coordinates.

(a) $(1, \sqrt{3})$ (b) $(-1, \sqrt{3})$ (c) $(1, -\sqrt{3})$ (d) $(-1, -\sqrt{3})$

3. Convert the following rectangular points to cylindrical coordinates.

(a) $(1, -1, 3)$ (b) $(-2, -2\sqrt{3}, -1)$

4. Convert the following spherical points (ρ, φ, θ) to rectangular points (x, y, z) .

(a) $\left(1, \frac{\pi}{3}, \frac{\pi}{3}\right)$ (b) $\left(2, \frac{\pi}{6}, \frac{\pi}{2}\right)$

5. Write an equation that describes the equation in polar coordinates.

(a) $x^2 + y^2 = 4$

(b) $x^2 + y^2 = 4y$

(c) $y = x$

(d) $x - y = 5$

6. Write an equation that describes the equation in cylindrical coordinates.

(a) $x^2 + y^2 + z^2 = 1$

(b) $z = \sqrt{x^2 + y^2}$

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

7. Write an equation that describes the equation in spherical coordinates.

(a) $x^2 + y^2 + z^2 = 1$

(b) $z = \sqrt{x^2 + y^2}$

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