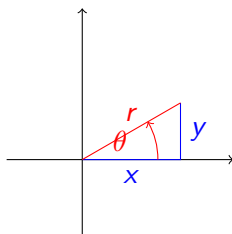


# Polar Coordinates



Conversion from polar to cartesian (rectangular)

$$x = r \cos \theta$$

$$y = r \sin \theta$$

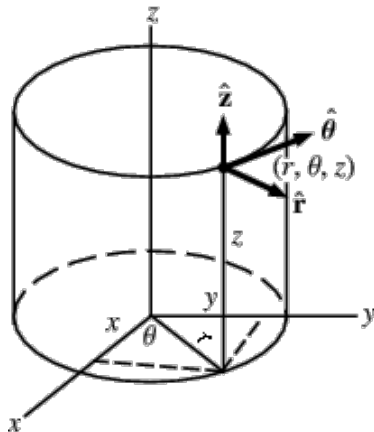
Conversion from cartesian to polar:

$$r = \sqrt{x^2 + y^2}$$

$$\cos \theta = \frac{x}{r} \quad \sin \theta = \frac{y}{r} \quad \tan \theta = \frac{y}{x}$$

# Cylindrical Coordinates

Just add the vertical dimension



Conversion from cylindrical to cartesian (rectangular):

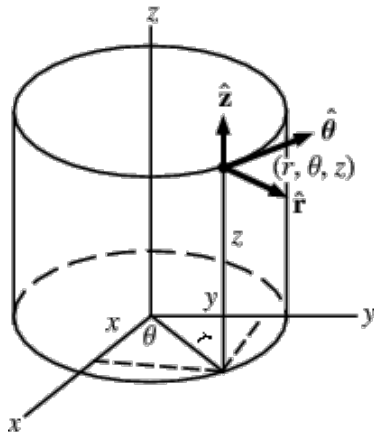
$$x = r \cos \theta \quad y = r \sin \theta$$
$$z = z$$

Conversion from cartesian to cylindrical:

$$r = \sqrt{x^2 + y^2}$$
$$\cos \theta = \frac{x}{r} \quad \sin \theta = \frac{y}{r} \quad \tan \theta = \frac{y}{x}$$
$$z = z$$

# Cylindrical Coordinates

Just add the vertical dimension



Conversion from cylindrical to cartesian (rectangular):

$$x = r \cos \theta \quad y = r \sin \theta$$
$$z = z$$

Conversion from cartesian to cylindrical:

$$r = \sqrt{x^2 + y^2}$$
$$\cos \theta = \frac{x}{r} \quad \sin \theta = \frac{y}{r} \quad \tan \theta = \frac{y}{x}$$
$$z = z$$