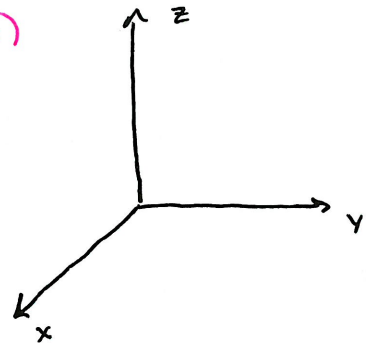
Section 15.8 - Cylindrical Coordinates

MVC

★ 3D equivalent to Polar Coordinates : (r, θ, z)



Example (a) Plot $(2, 2\pi/3, 1)$ find the Cartesian Coords
(b) Find Cylindrical Coords for $(3, -3, -7)$

Example Identify and sketch the surface $z = 4 - r^2$.

Example A solid E lies within $x^2 + y^2 = 1$, below $z = 4$, above $z = 1 - x^2 - y^2$. The density at any point is proportional to its distance from the axis of the cylinder. Find the mass of E.

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- Extra Examples:

#12. Sketch the solid described by $0 \le \theta \le \pi/2$, $r \le z \le 2$

#17. Evaluate $\iiint_E \sqrt{x^2+y^2}\, dV$, where E is the region that lies inside the cylinder $x^2+y^2=16$ and between the planes $z=-5$ and $z=4$.

#21. Evaluate $\iiint_E x^2\, dV$, where E is the solid that lies within the cylinder $x^2+y^2=1$, above $z=0$ and below the cone $z^2=4x^2+4y^2$.