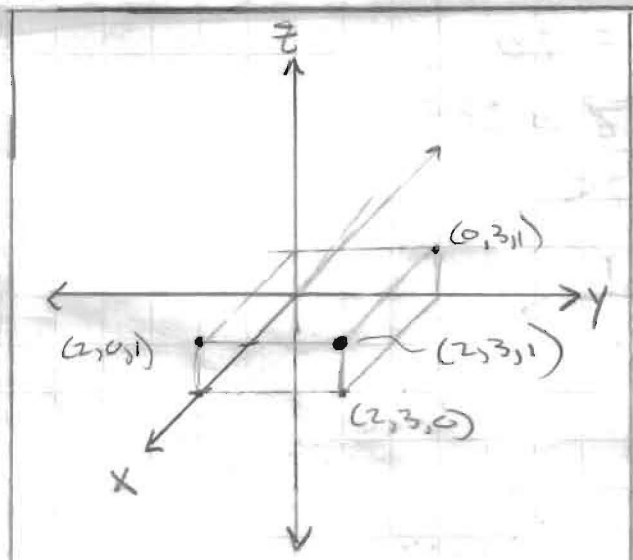
Section 12.1 - 3D-COORDINATE SYSTEM

TOP Board



Distance Formula

Equation for a Sphere

I) 3-D Rectangular Coordinate System

(a) "coordinate axis" - x, y, z

(b) "coordinate planes" - xy, xz, yz

(c) "octants"

(d) "coordinates" - plot a point

(e) "projections"

II) Distance Formula $\left[(x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2\right]^{1/2}$

Equation for a Sphere

radius = r
center = (a, b, c)

$$(x-a)^2 + (y-b)^2 + (z-c)^2 = r^2$$

Example - Sphere

$$2x^2 + 2y^2 + 2z^2 + 8x - 4y = 40$$

$$x^2 + y^2 + z^2 + 4x - 2y = 20$$

$$\Rightarrow (x^2+4x+4) + (y^2-2y+1) + z^2 = 20+4+1$$

$$\Rightarrow (x+2)^2 + (y-1)^2 + z^2 = 25$$

$$C = (-2, 1, 0) \qquad r = 5$$

- Plane