

MA 166 - SPRING 2019

PROF SA BARRETO

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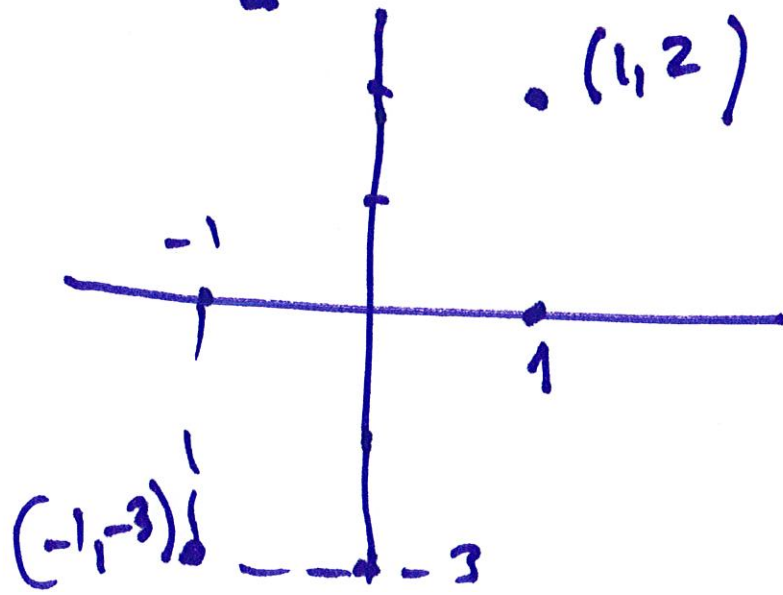
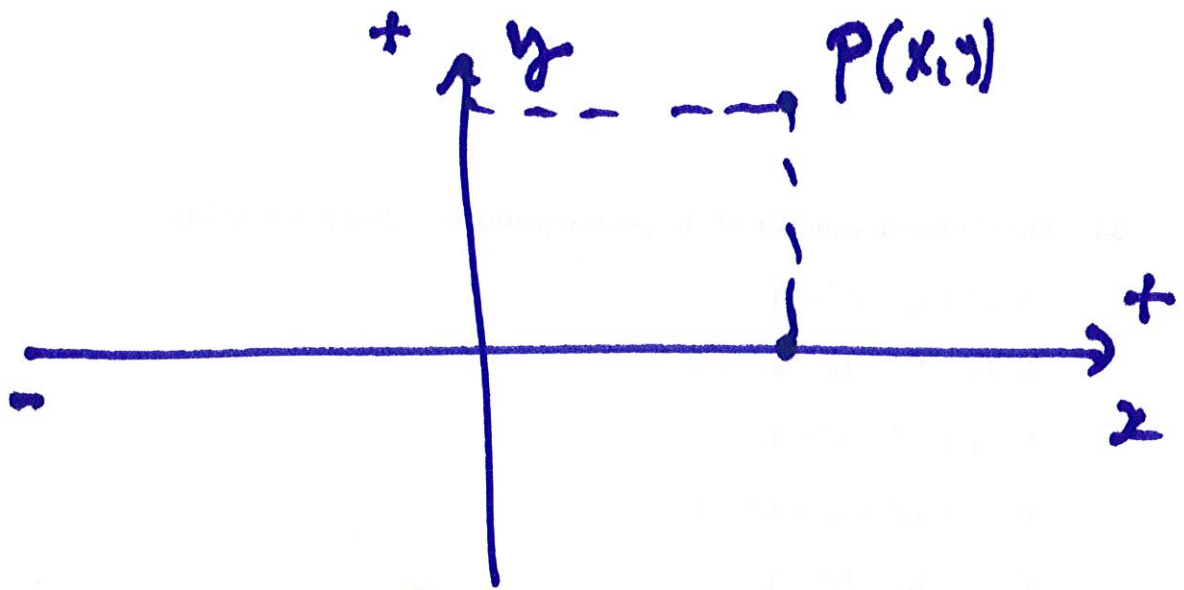
OFFICE HOURS: MON 4:00-5:00
TUE 2:00-3:00

OFFICE: MATH 640

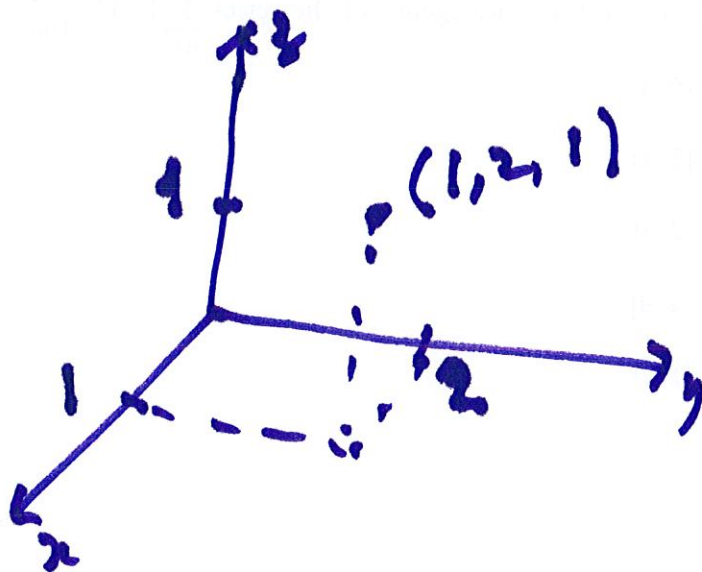
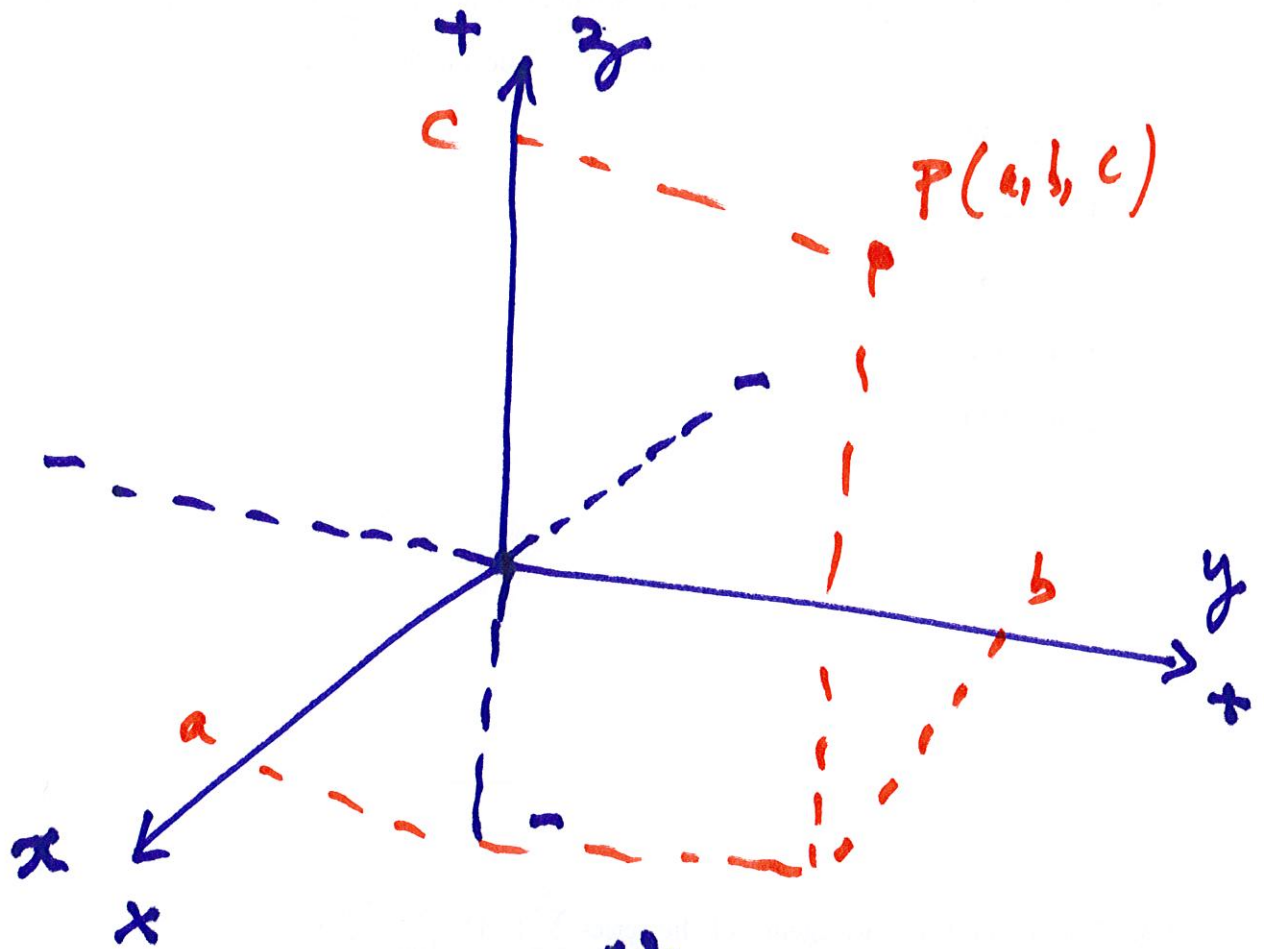
Lesson 1

Section 12.1 Coordinates in 3-Dimensions.

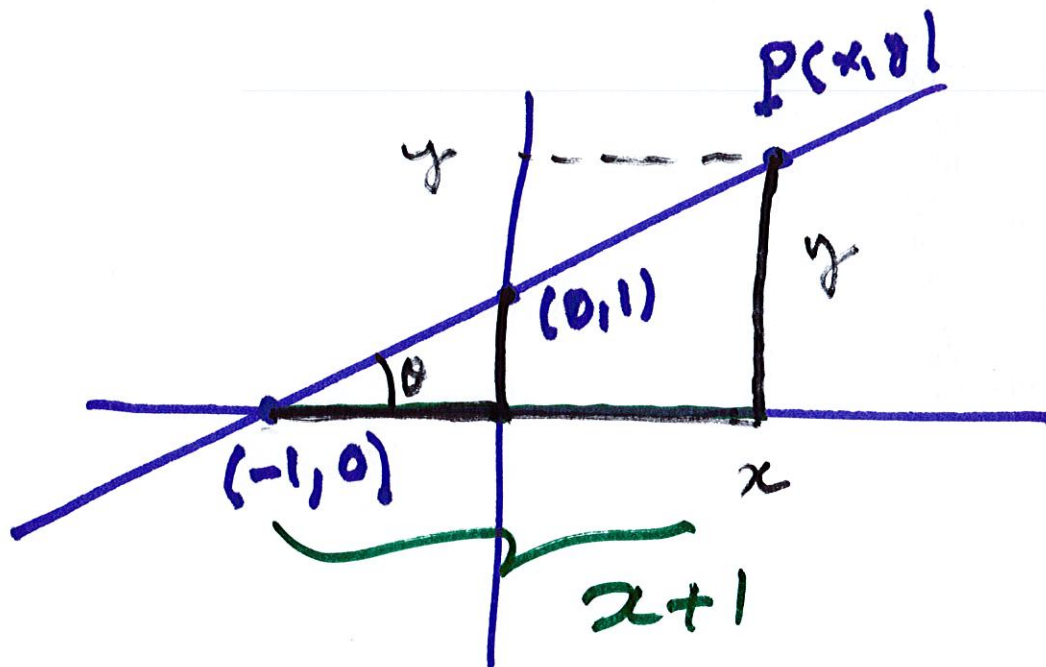
2 Dimensions



3 - Dimensions



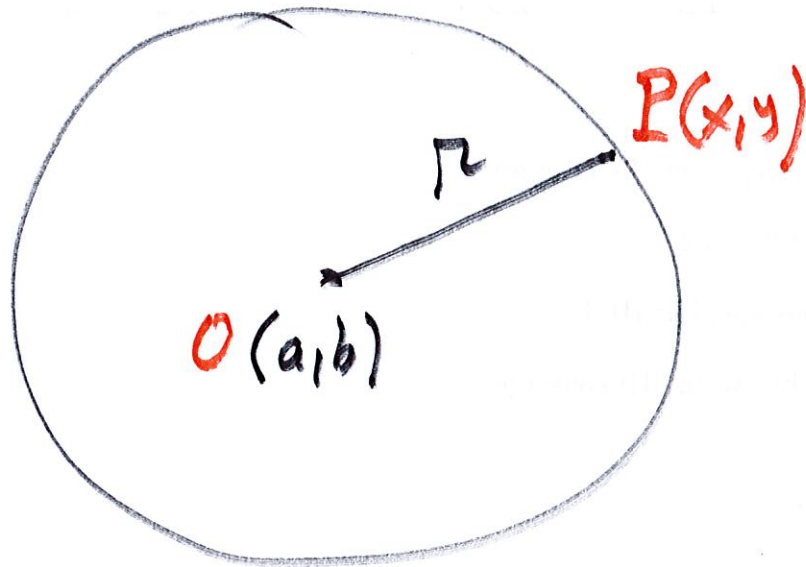
2 Dimensions



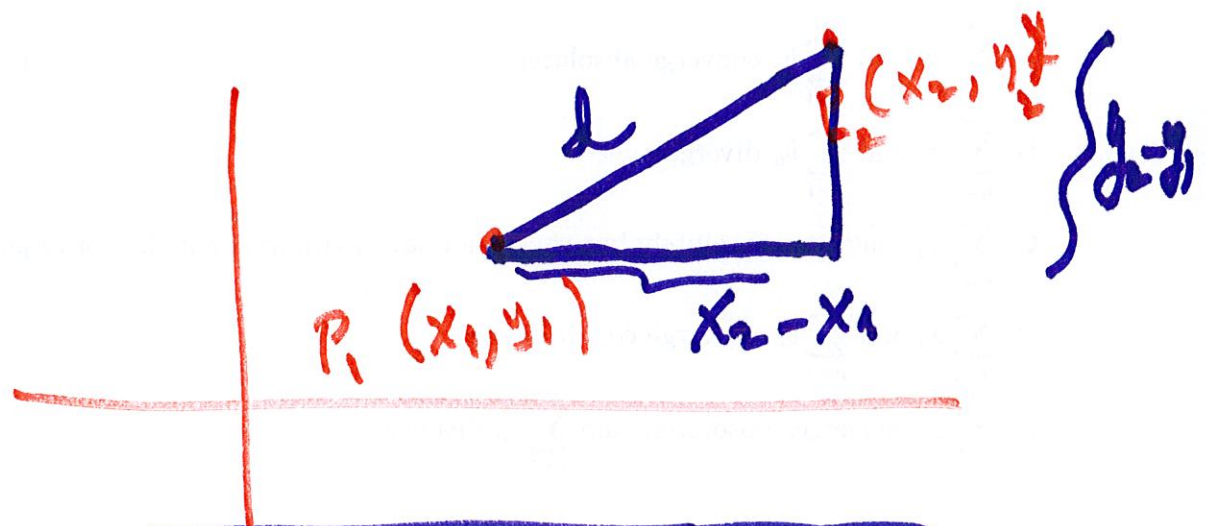
$$\frac{y}{x+1} = 1$$

$$\boxed{y = x + 1}$$

Circles



Distance between P and O
is equal to r .



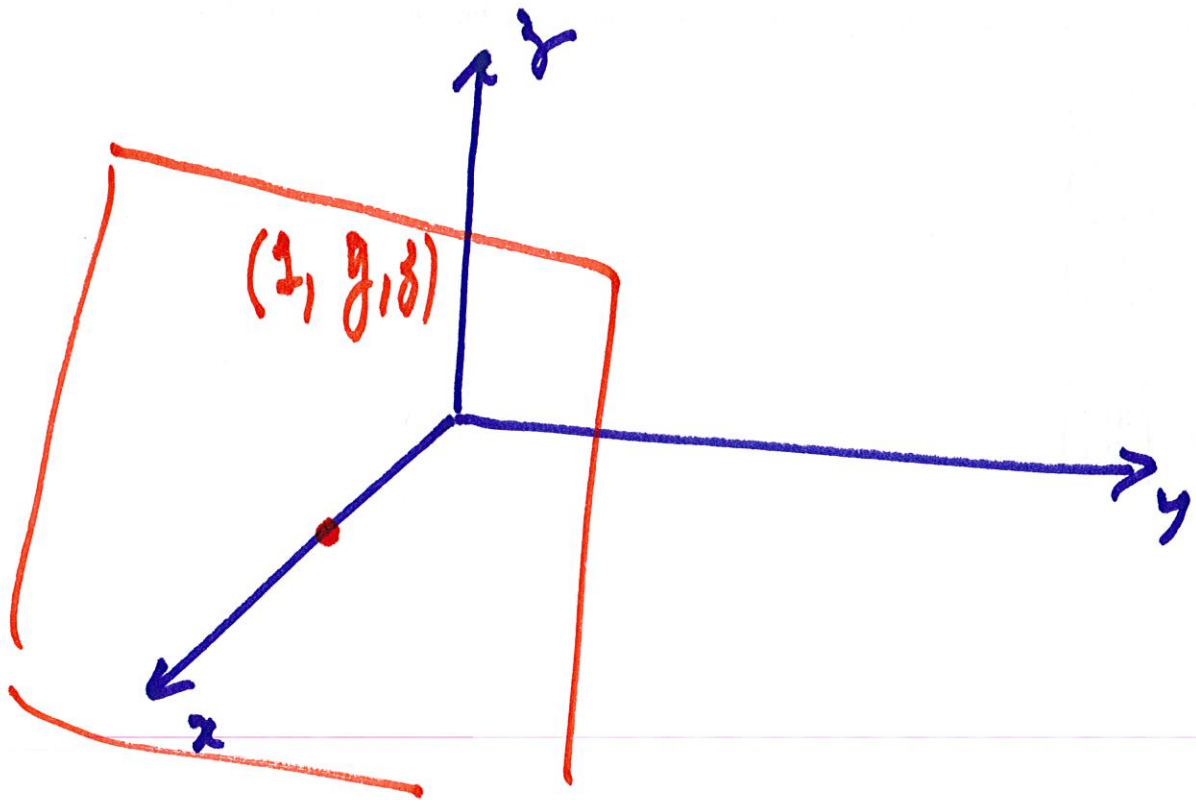
$$d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}.$$

Distance between P and Q

$$\sqrt{(x-a)^2 + (y-b)^2} = r$$

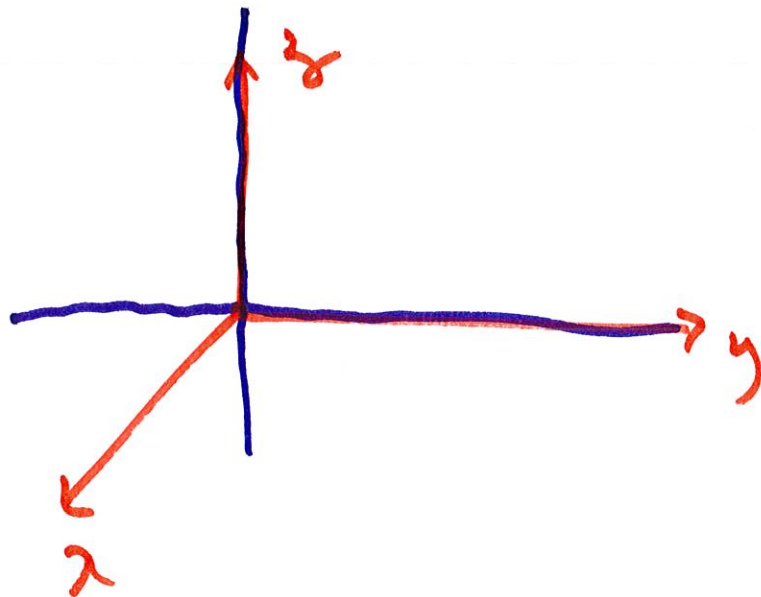
$$(x-a)^2 + (y-b)^2 = r^2$$

3 Dimensions

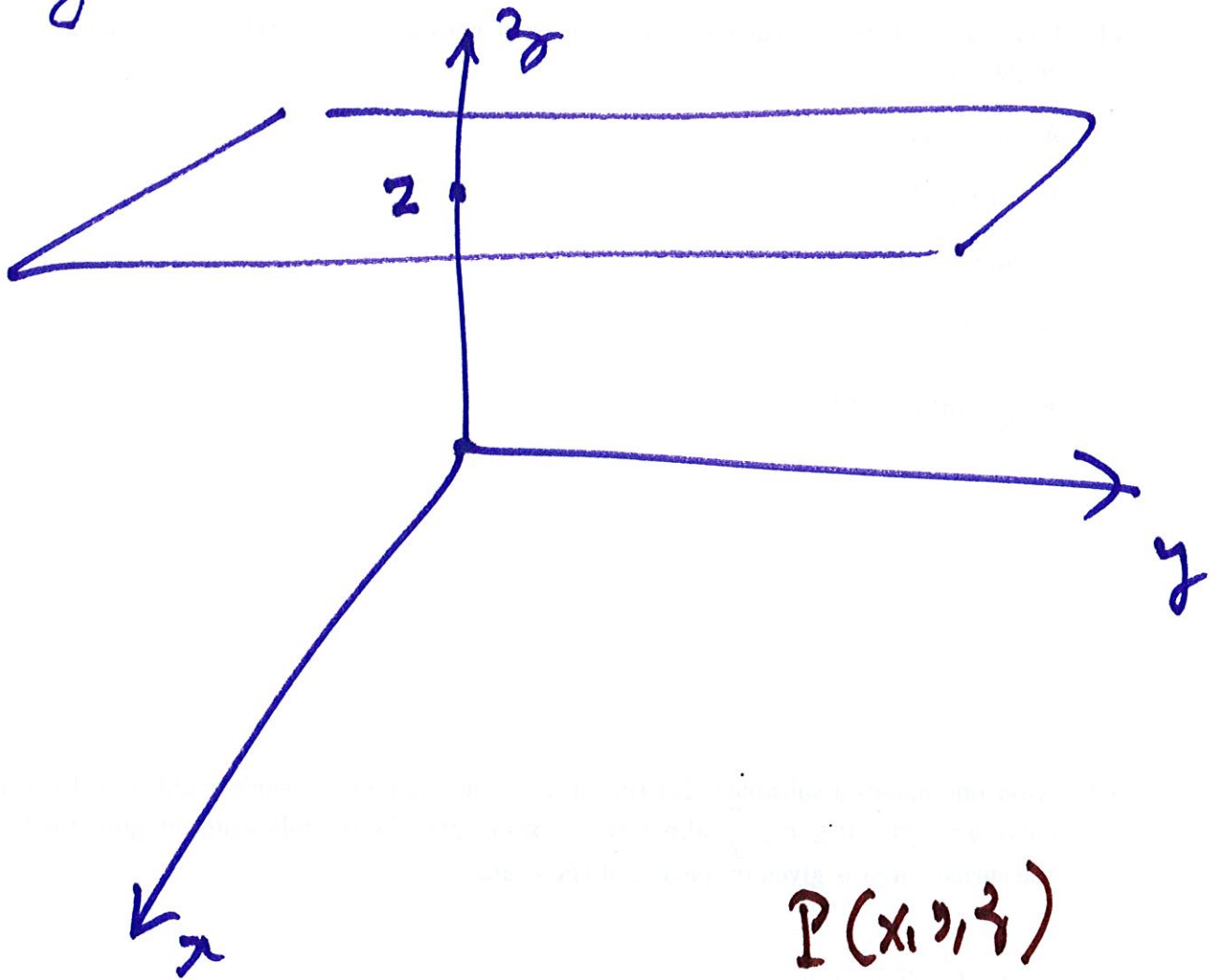


$x = 1$. $P(1, y, z)$

$x = 0$
is the
 y - z plane.



$$z = 2$$

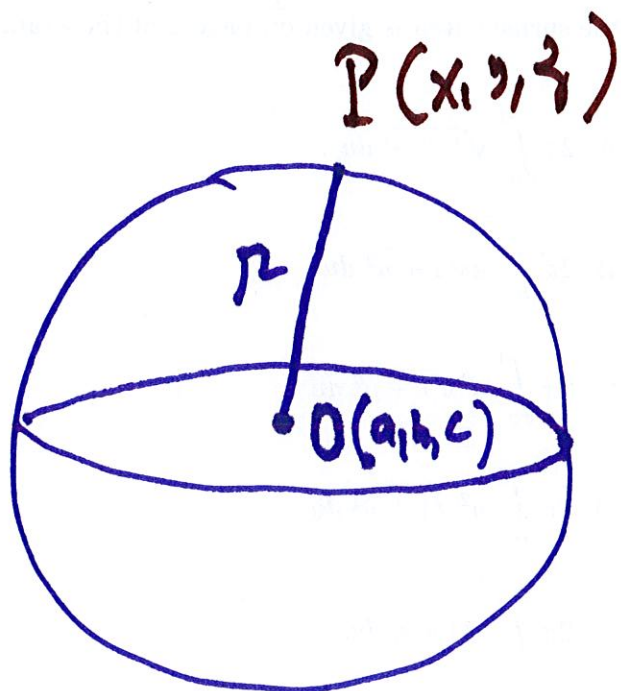


Spheres :

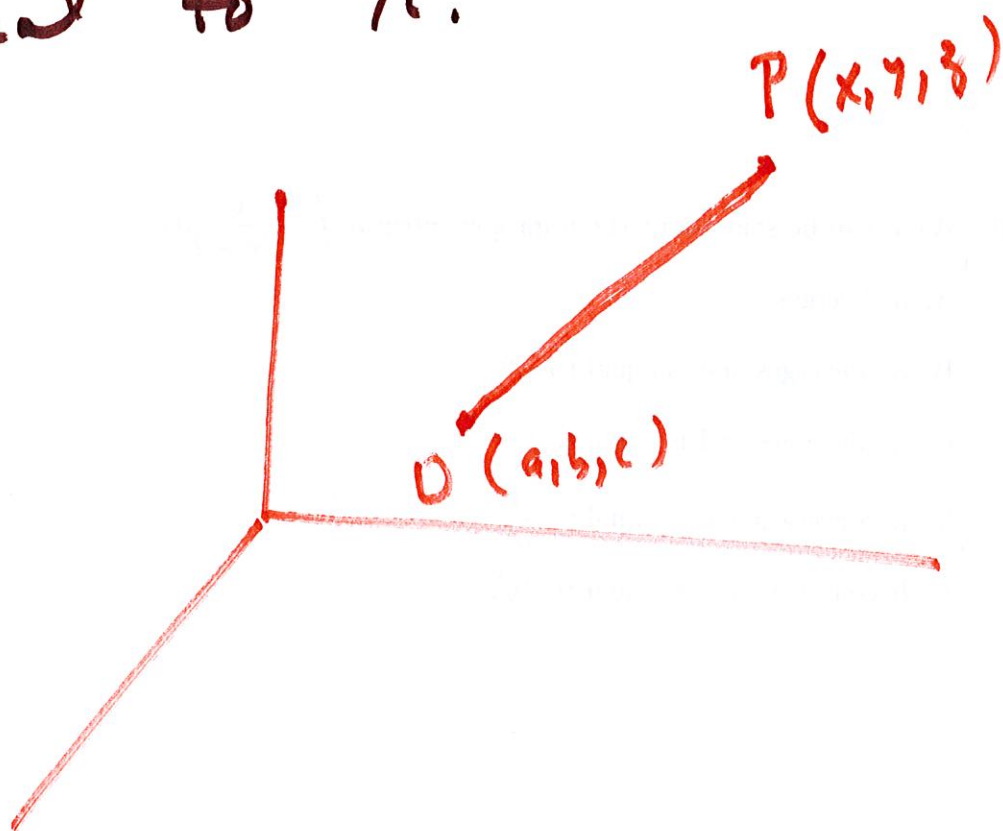
Center

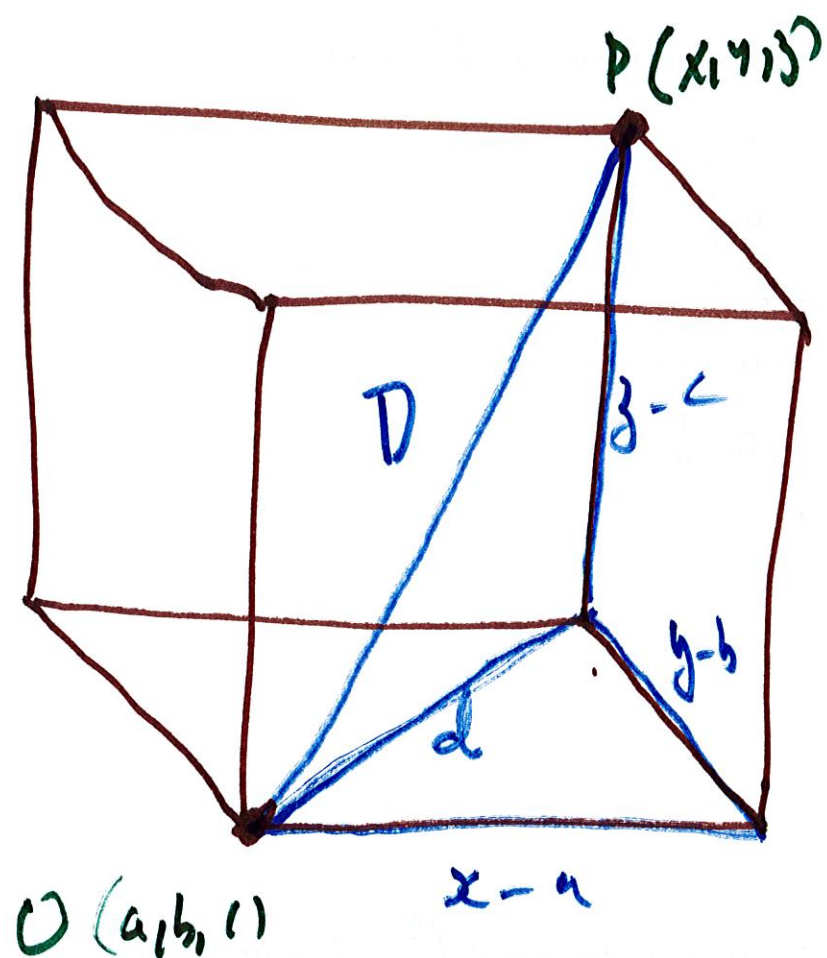
$O(a, b, c)$

Radius r .



Sphere... $P(x, y, z)$ is on
the sphere of center
 $O(a, b, c)$ if the distance
between P and O is
equal to r .





$$D^2 = (z-c)^2 + \underbrace{d^2}$$

$$d^2 = (x-a)^2 + (y-b)^2$$

$$\boxed{D^2 = (x-a)^2 + (y-b)^2 + (z-c)^2}$$

Equation of the Sphere

$$\left| (\underline{x-a})^2 + (y-b)^2 + (z-c)^2 = r^2 \right|$$

Example: Verify that

$$x^2 + 4x + y^2 + 10y + z^2 + 6z = 10$$

describes a sphere. Find

its Center and its

radius.

Complete Squares

$$\underline{x}^2 + \underline{4}x = (x+2)^2 - 4$$

$$(x+\underline{a})^2 = \underline{x}^2 + \underline{2a}x + a^2$$

$$\underline{x^2 + 4x} + y^2 + 10y + z^2 - 6z = 10$$

$$\downarrow$$
$$(x+2)^2 - 4 + (y+5)^2 - 25 + (z-3)^2 - 9 = 10$$

$$\boxed{(x+2)^2 + (y+5)^2 + (z-3)^2 = 48}$$

Center: $(-2, -5, 3)$, $\text{radius} = \sqrt{48}$.