

MY NAME : PROFESSOR SA BARRETO

EMAIL : SABARRE@PURDUE.EDU

OFFICE : MATH 640

OFFICE HOURS : MON: 4:00 To 5:00
TUE 1:00 To 2:00
FRI 2:00 To 3:00

OR BY APPOINTMENT.

COURSE PAGE : WWW.MATH.PURDUE.EDU/MA166.

IMPORTANT THINGS : COURSE CALENDAR.

GROUND RULES : INFORMATION ABOUT GRADES
ETC.

QUIZ EXERCISES DUE EVERY THURSDAY
IN RECITATION.

FIRST SET DUE ON THURSDAY.

THESE WILL NOT BE GRADED. YOUR TA WILL
SUBTRACT 4 POINTS (OUT OF 20) IF
YOU DO NOT TURN IN A SUBSTANTIAL
NUMBER OF PROBLEMS (70% TO 80%)

LOGIN THROUGH COURSE WEB PAGE

READ BASIC WEBASSIGN INFO FOR
STUDENTS

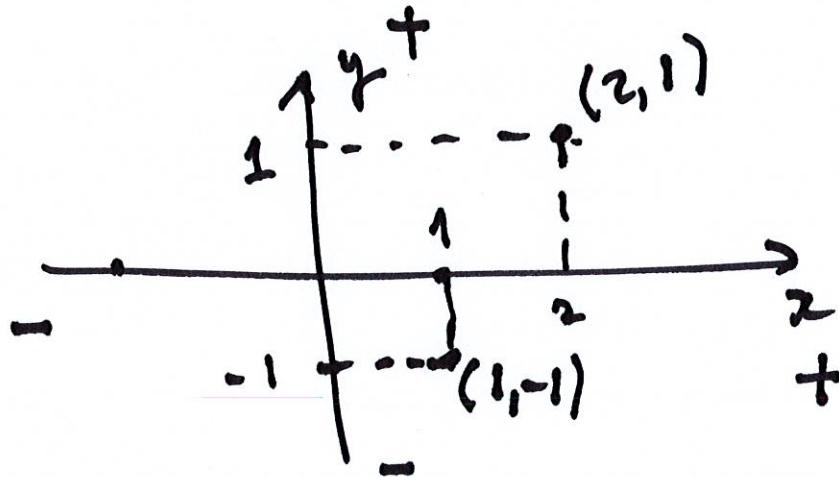
READ LOGIN HELP

INCLUDING THIS ONE
MY LECTURE NOTES WILL BE POSTED
ON MY HOME PAGE.

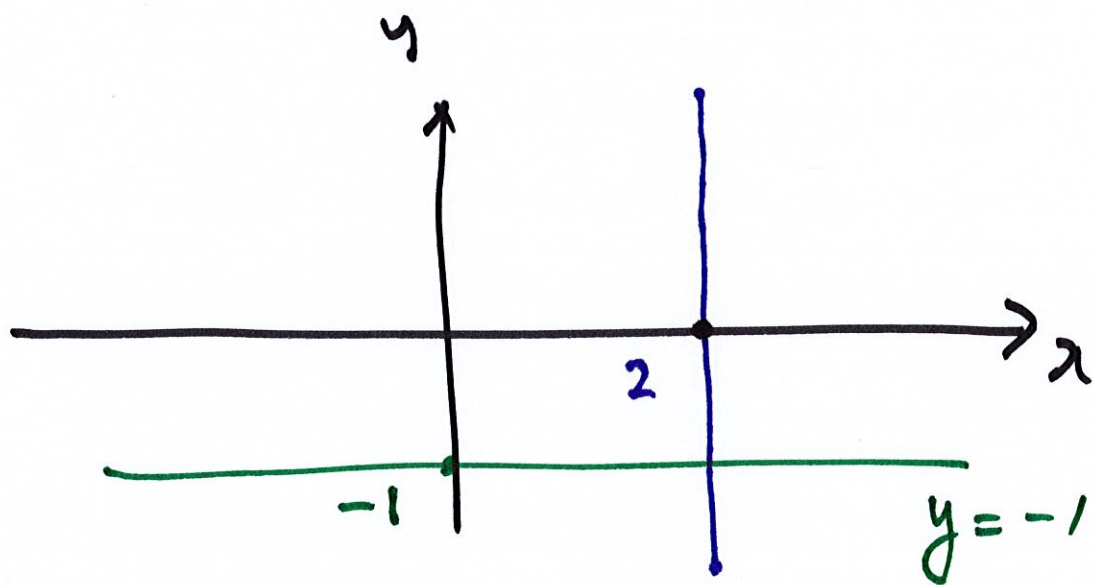
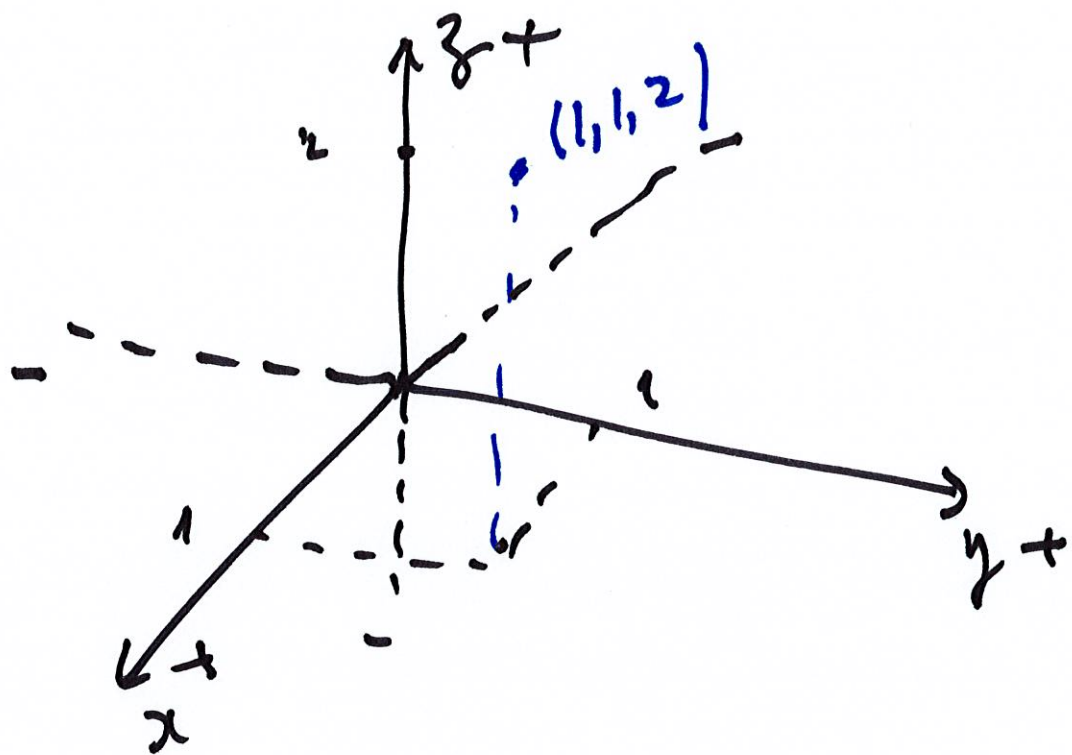
WWW.MATH.PURDUE.EDU/NSABARRÉ.

Lesson 1 Sections 12.1 and 12.2.

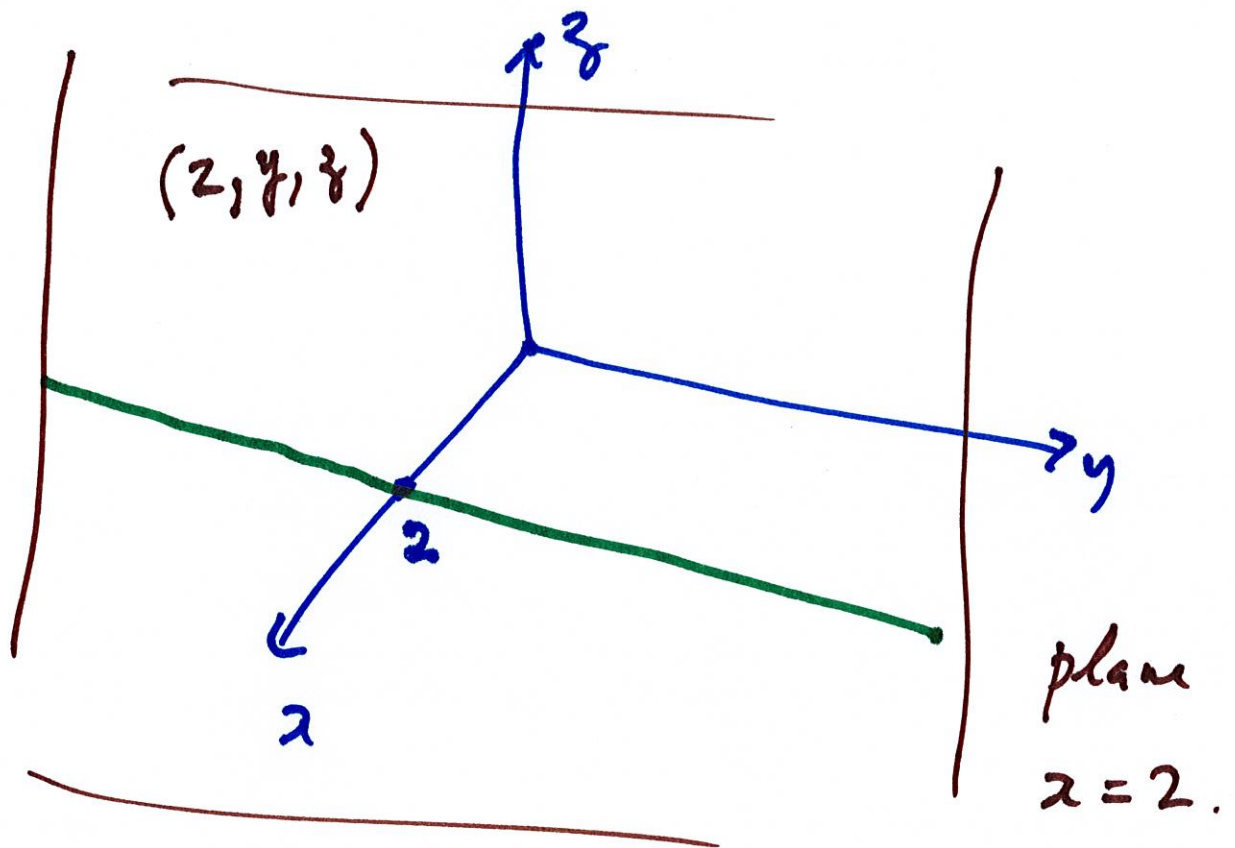
12.1 Coordinates in 3-dimensions



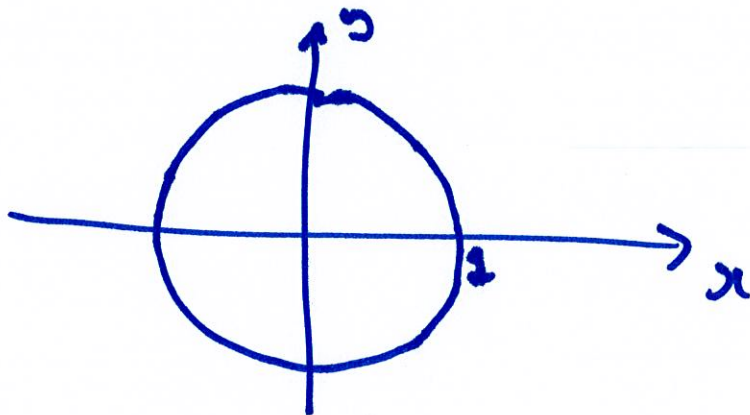
Any point on the plane can be identified by a pair of numbers (a, b)

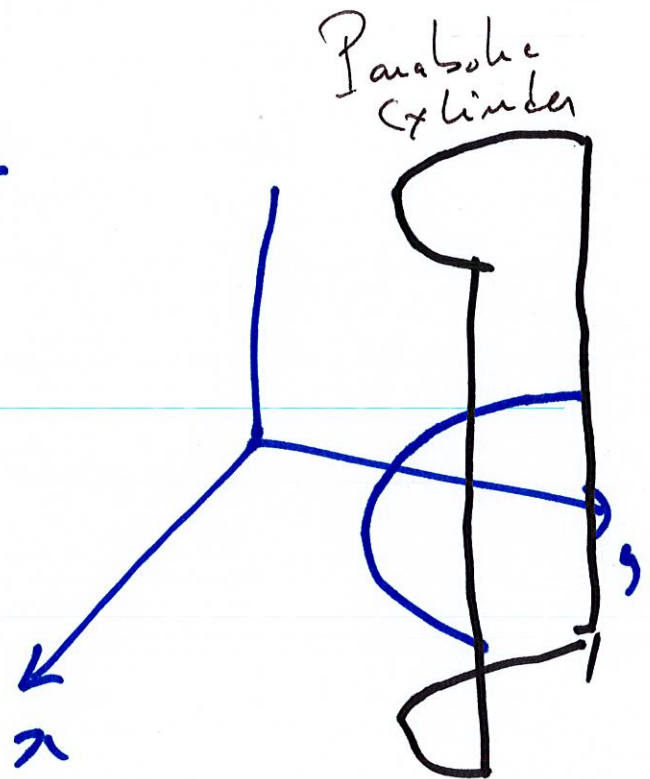
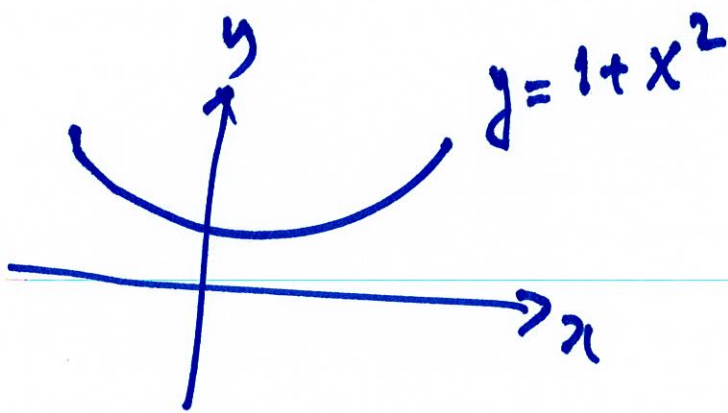
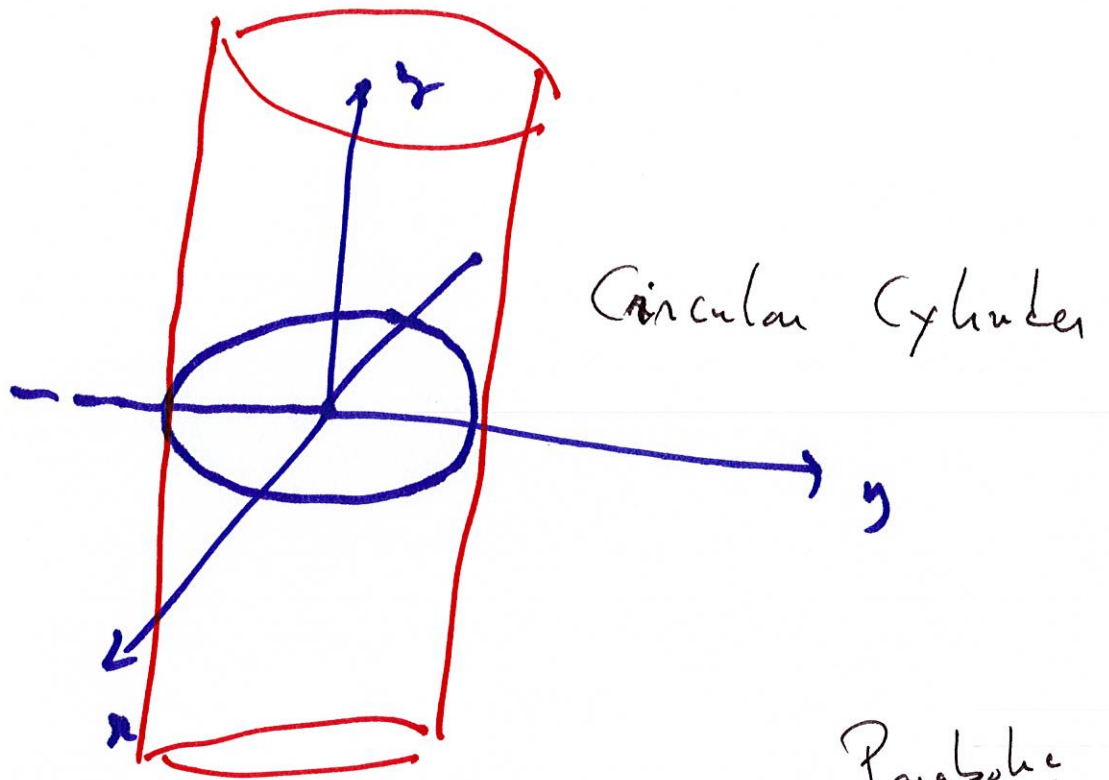


$x = 2$

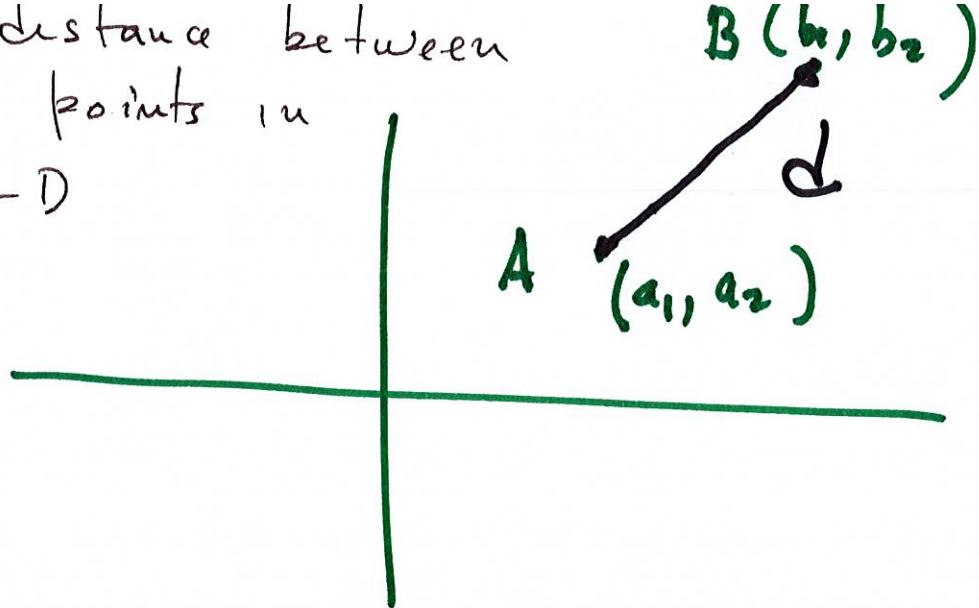


Circle: $x^2 + y^2 = 1$



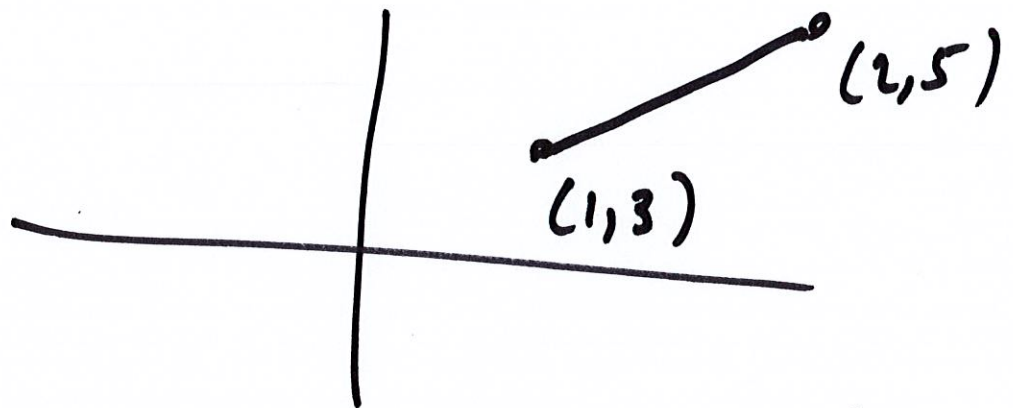


The distance between
two points in
2-D



$$d^2 = (b_2 - a_2)^2 + (b_1 - a_1)^2$$

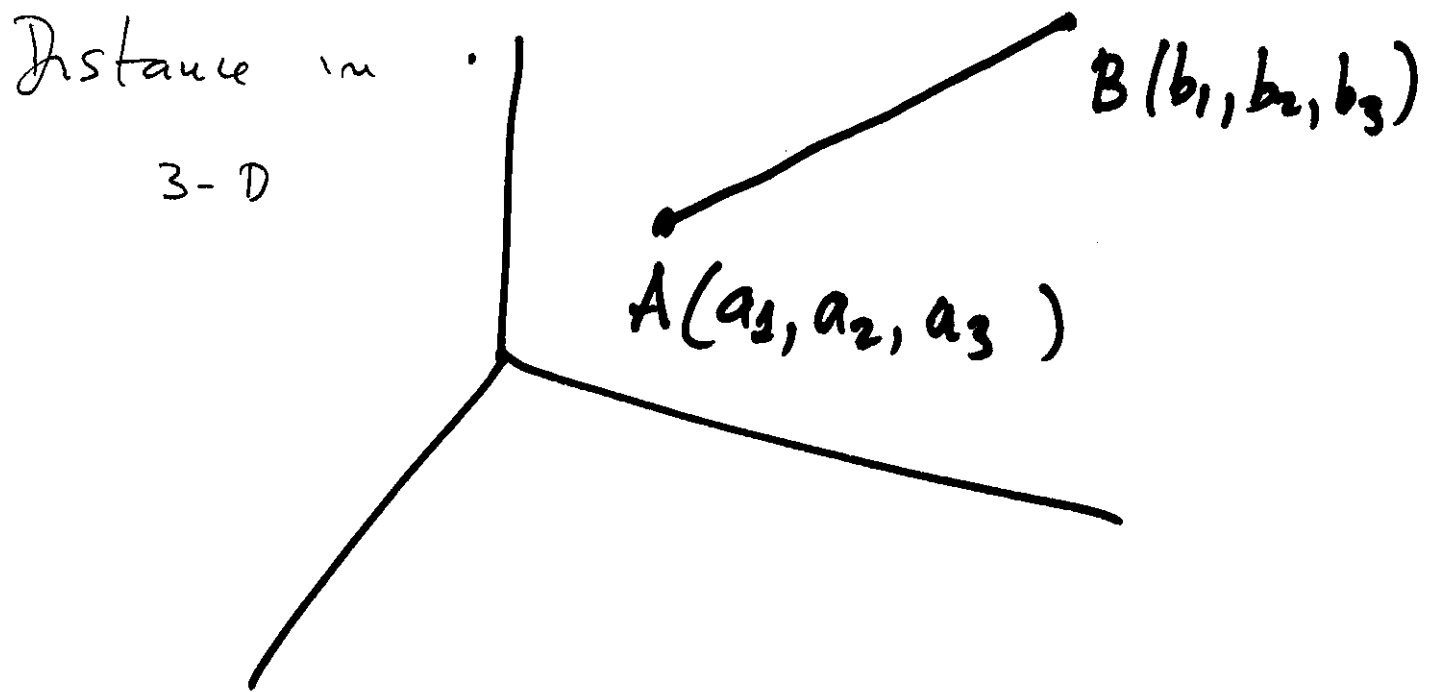
Ex.:



$$d^2 = (2-1)^2 + (5-3)^2$$

$$= 1 + 4 = 5$$

$$d = \sqrt{5}.$$



$$d^2 = (b_1 - a_1)^2 + (b_2 - a_2)^2 + (b_3 - a_3)^2.$$

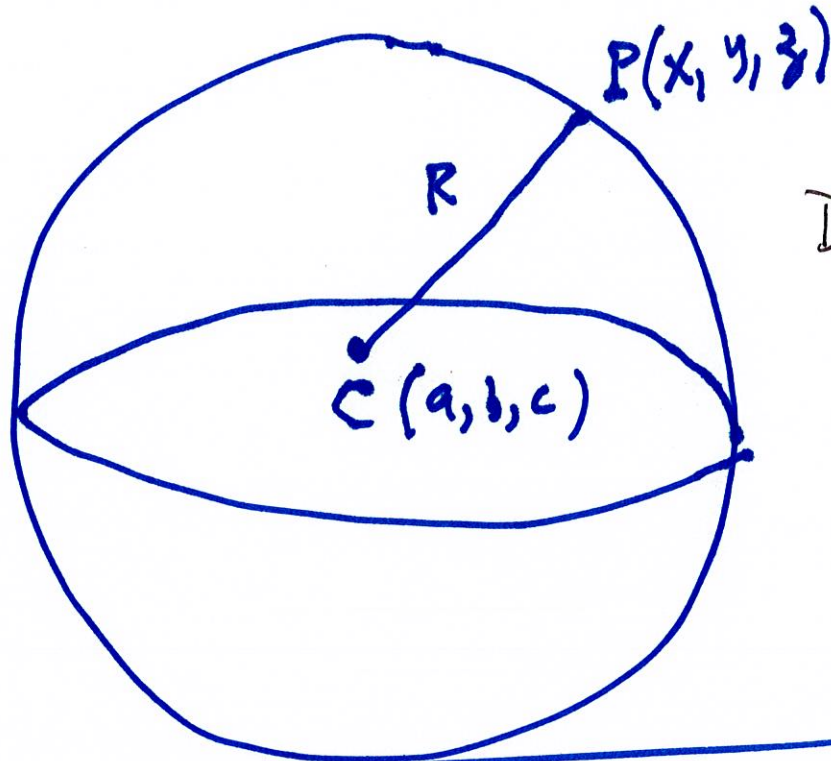
Ex: $A(1, 2, 5)$, $B(3, 1, 8)$

$$d^2 = (2)^2 + (-1)^2 + (3)^2$$

$$= 4 + 1 + 9 = 14$$

$$d = \sqrt{14}.$$

Spheres :



Distance
between
 P and C
 $= R$

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

Sphere of Center $(1, 0, 2)$

Radius 3.

$$(x-1)^2 + (y-0)^2 + (z-2)^2 = 9.$$

$$x^2 - 2x + 1 + y^2 + z^2 - 4z + 4 = 9$$

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

Find the radius and center of the sphere given by

$$\underbrace{x^2 - 4x} + \underbrace{y^2 + 6y} + z^2 - 2z = 6.$$

$$\begin{aligned}x^2 - 4x &= (x-2)^2 - 4 \\&= x^2 - 4x + 4 - 4\end{aligned}$$

$$y^2 + 6y = (y+3)^2 - 9$$

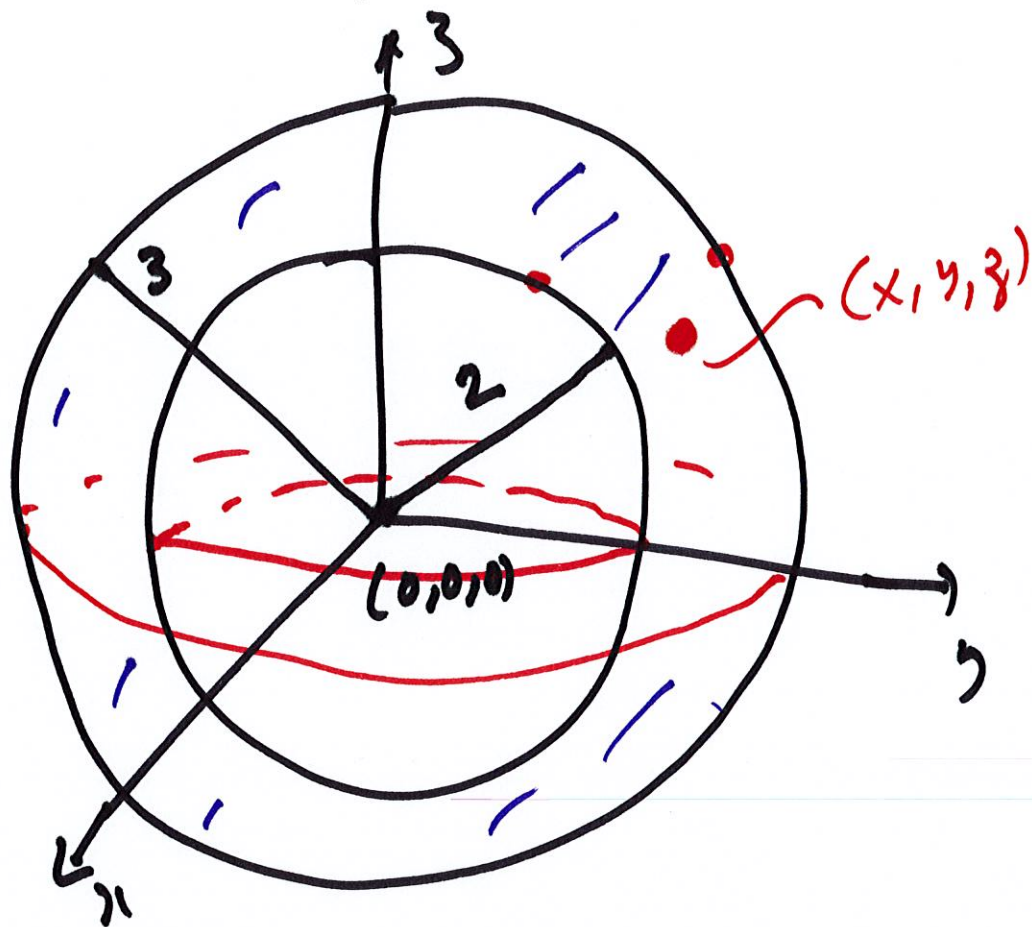
$$z^2 - 2z = (z-1)^2 - 1.$$

$$(x-2)^2 - 4 + (y+3)^2 - 9 + (z-1)^2 - 1 = 6$$

$$\boxed{(x-2)^2 + (y+3)^2 + (z-1)^2 = 20}$$

$$\text{Center } (2, -3, 1) \quad \text{Radius} = \sqrt{20}.$$

The region between
two spheres



$$x^2 + y^2 + z^2 = 9$$

$$x^2 + y^2 + z^2 = 4.$$

$$4 \leq x^2 + y^2 + z^2 \leq 9$$