??
xy
$solid$
P
$P =$
(a, b, c)
a
b
c
P
x
y
z
x
y
z
$P =$
$(2, 1, 3)$
??
$P =$
$(2, 1, 3)$
xy
z
xy
z
xy
z
??
P
$P =$
$(2, 1, 3)$
Measuring Distances
$_{d}istanceDistanceInSpaceLet_1, y_1, z_1)$
$Q =$
(x_2, y_2, z_2)
D
P
Q
$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}.$

P
Q
$\overline{PQ}$
$||\overline{PQ}||$
$_{s}pace1Lengthofalinesegment Let$
$and let$
$.Drawthelinesegment \overline{PQ}$
P
Q
??
$can-$
not
??
$||\overline{PQ}|| = \sqrt{(2-1)^2 + (1-4)^2 + (1-(-1))^2} = \sqrt{14} \approx 3.74.$

P
Q
??
Spheres
$plane$
$space$
??
$C =$
(a, b, c)
r
$P =$
(x, y, z)
P
r
C
$||\overline{PC}|| = \sqrt{(x-a)^2 + (y-b)^2 + (z-c)^2} = r.$

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

$_{s}pace2Equationofasphere Findthecenterandradiusofthespheredefinedby^2+$
$2x+$
y^2-
$4y+$
z^2-
$6z =$
$2.$
$^2+$
$2x+$
y^2-
$4y+$
z^2-
$6z =$