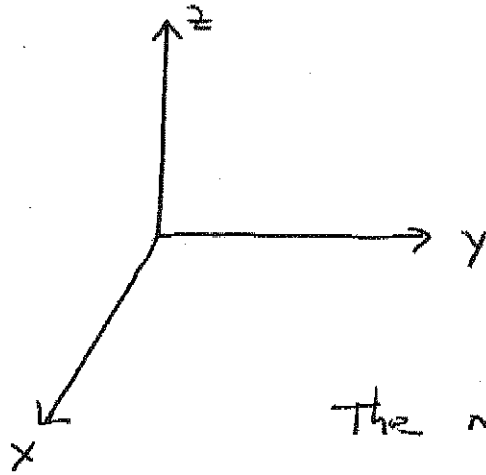


12.1: 3-D Coordinate Systems.

The axes



The right hand rule.

Locate coordinates in 3 space,

projections,

$$\mathbb{R}^3 = \{ (x, y, z) \mid x, y, z \in \mathbb{R} \}$$

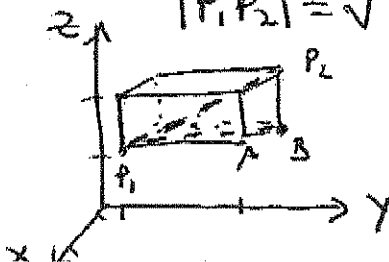
Ex 1: Plot $x=4$ and $z=-z$

Ex 2: Plot $y=x+1$ and $y=x^2+1$

Distance Formulas in \mathbb{R}^3 , The distance from

$P_1(x_1, y_1, z_1)$ to $P_2(x_2, y_2, z_2)$ is

$$|P_1 P_2| = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$



$$|P_1 B|^2 = |P_1 A|^2 + |AB|^2$$

$$|P_1 P_2|^2 = |P_1 B|^2 + |BP_2|^2$$

$$= |P_1 A|^2 + |AB|^2 + |BP_2|^2$$

12,1
2/2

Ex3: Find the distance from $A(1, 2, 3)$
to $B(2, -5, 8)$

Find the equation of a sphere w/ radius r
centered at (a, b, c) .

Ex4: What is $x^2 + y^2 + z^2 = 4x - 2y$ (a sphere)

Ex5: Describe $4 \leq x^2 + y^2 + z^2 \leq 25$ and $x^2 + y^2 = 1$
using a picture.

