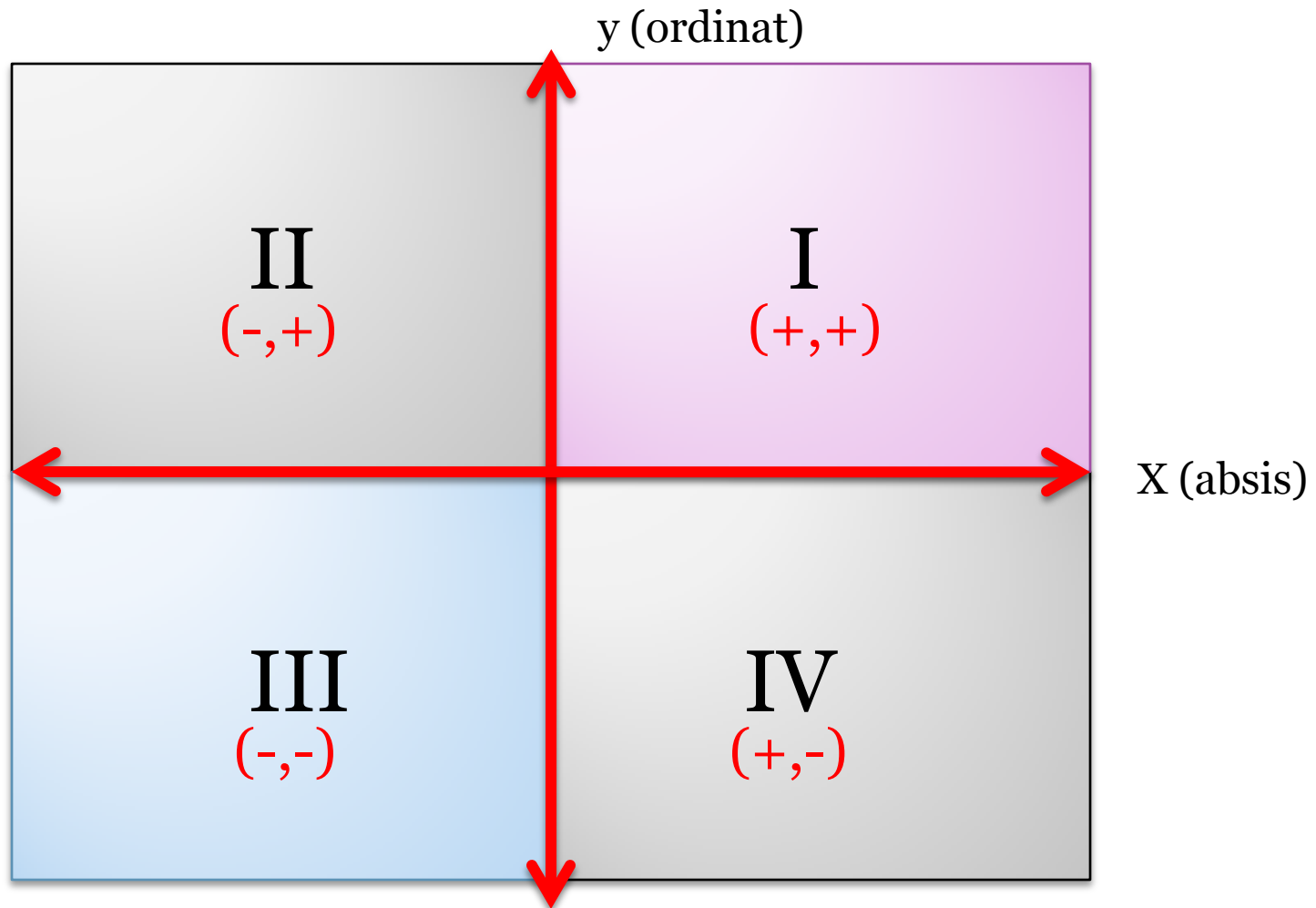


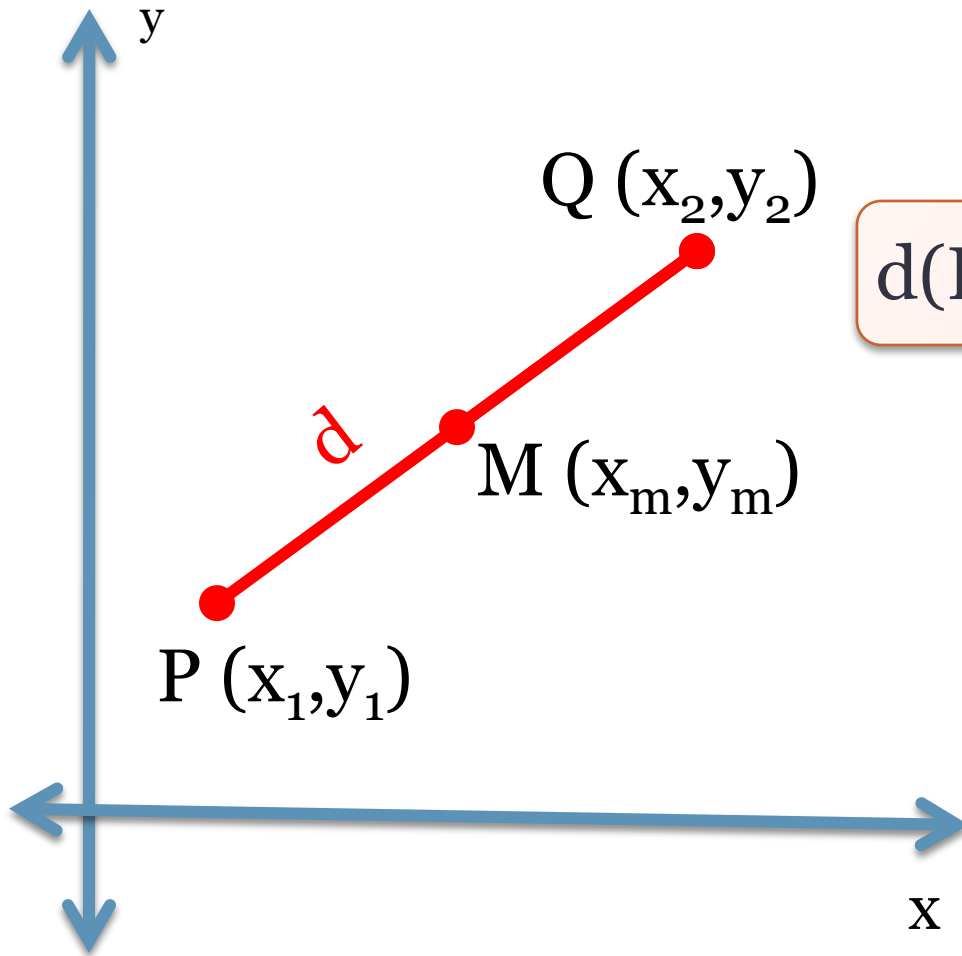
Sistem Koordinat *[kartesian Ruang-Tiga]*

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Dept. Of Electrical Engineering
Brawijaya University

Koordinat Kartesian



Jarak d dan Titik Tengah $M (x_m, y_m)$



$$d(P, Q) = ((x_2 - x_1)^2 + (y_2 - y_1)^2)^{1/2}$$

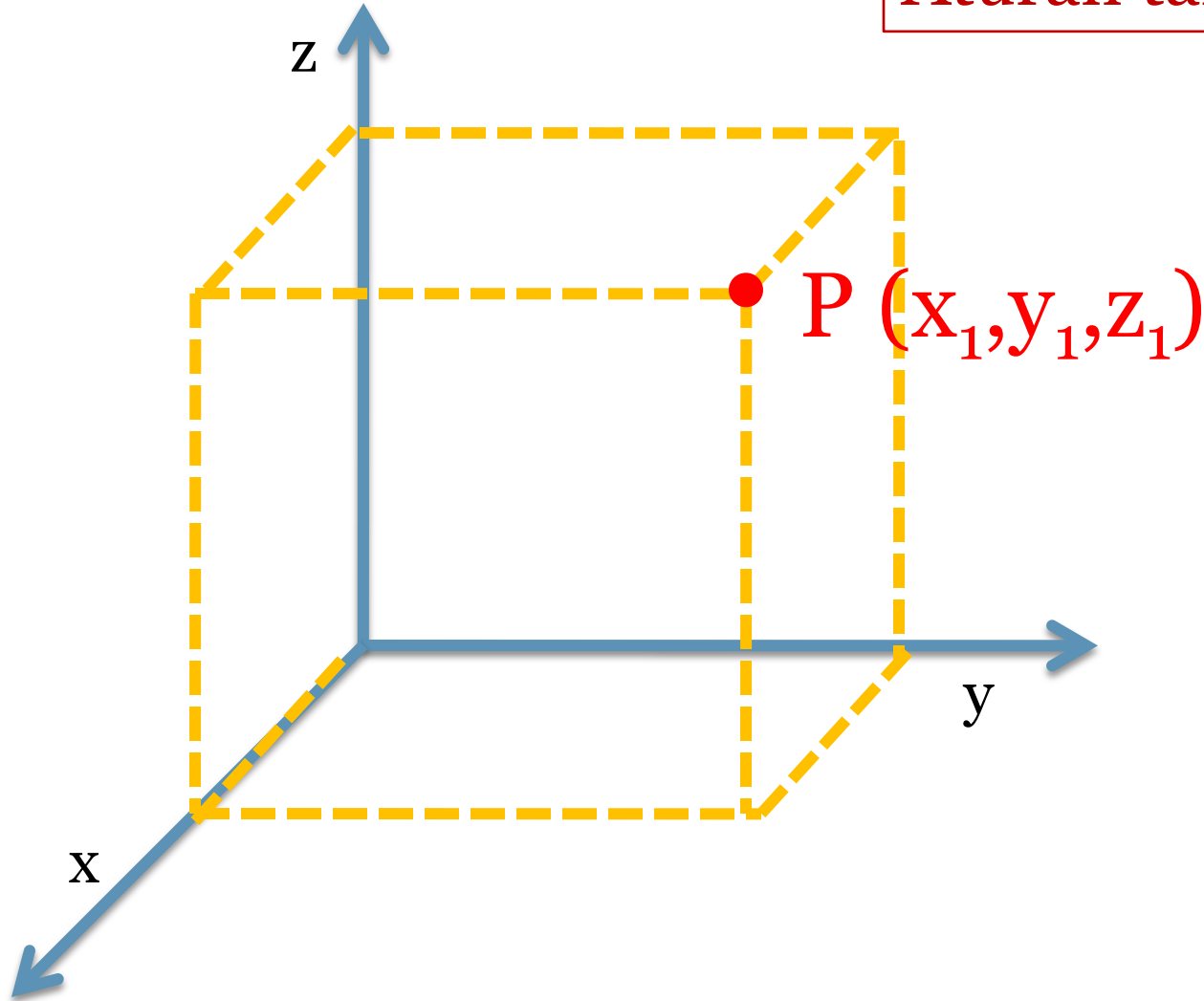
$$x_m - x_1 = x_2 - x_m$$

$$x_m = (x_2 + x_1) / 2$$

$$y_m = (y_2 + y_1) / 2$$

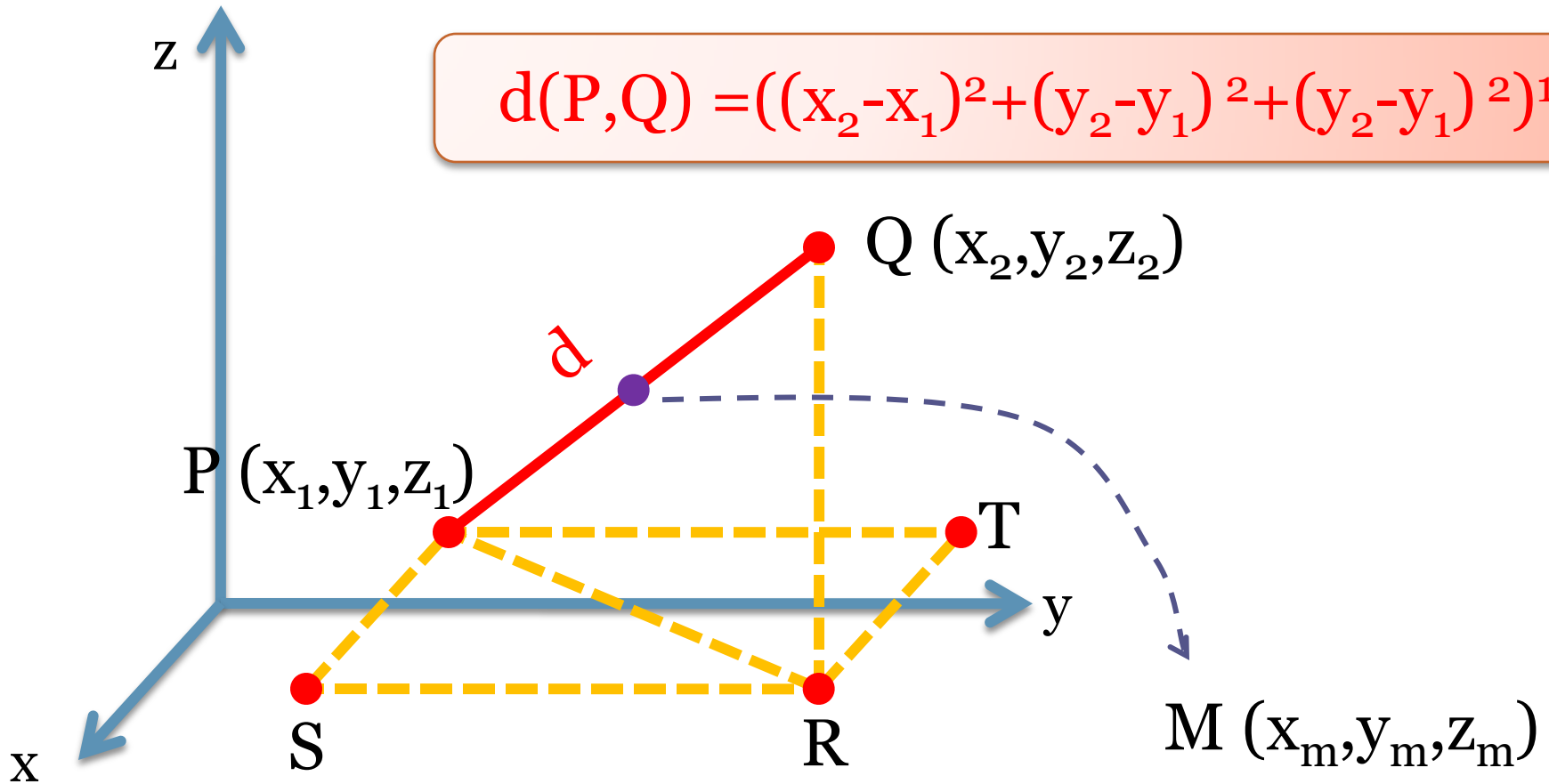
Koordinat tiga Ruang

Aturan tangan kanan



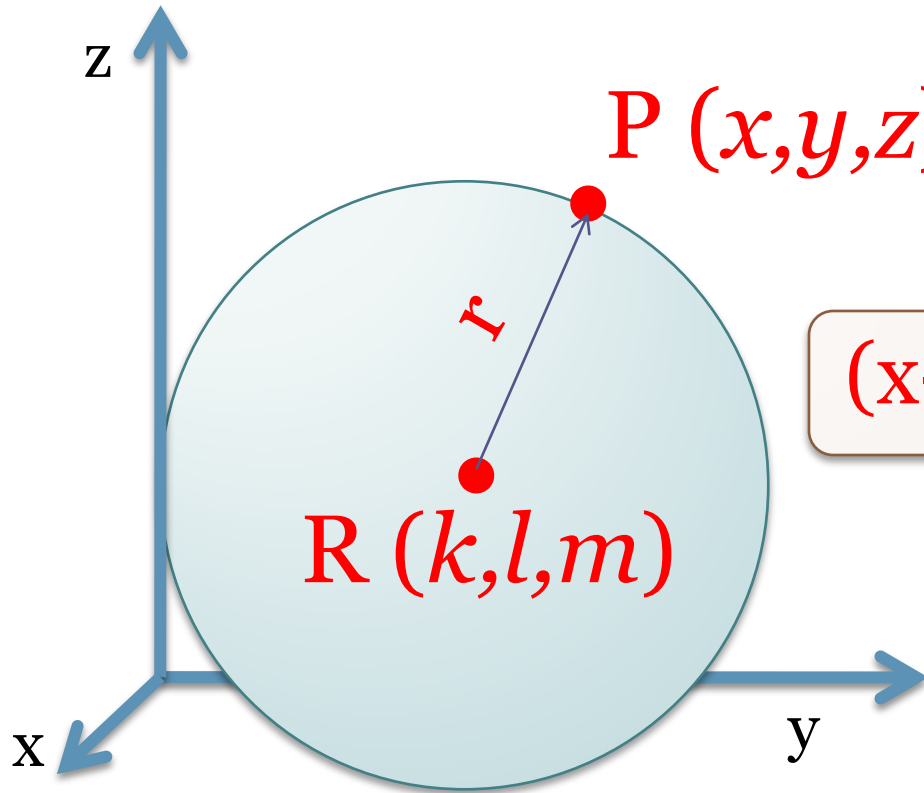
Jarak antar Titik (d)

$$d(P,Q) = ((x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2)^{1/2}$$



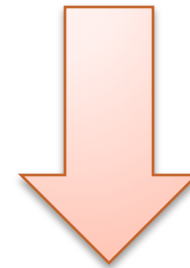
$$x_m = (x_2 + x_1)/2; \quad y_m = (y_2 + y_1)/2; \quad z_m = (z_2 + z_1)/2;$$

Bola dan Persamaannya



Persamaan umum:

$$(x-k)^2+(y-l)^2+(z-m)^2=r^2$$



$$x^2+y^2+z^2+Ax+By+Cz+D=0$$

Contoh problem

- Tentukan jari-lingkaran dari:

$$x^2+y^2+z^2-6x-8y-10z+34=0$$

- Perlengkapan Kuadrat

$$(x^2-6x)+(y^2-8y)+(z^2-10z)+34=0$$

$$(x^2-6x+9)+(y^2-8y+16)+(z^2-10z+25)=-34+9+16+25$$

$$(x-3)^2+(y-4)^2+(z-5)^2=16$$

$$r=4$$


$$r^2=16$$

Jari (r) dari titik tengah

$$x_r = (x_1+x_2)/2; \quad y_r = (y_1+y_2)/2; \quad z_r = (z_1+z_2)/2$$

- Ex. Tentukan pers. bola jika diameternya pada titik $(-1,2,3)$ dan $(5,-2,7)$

$$\text{Titik } r=(2,0,5)$$

$$r^2=(5-2)^2+(-2-0)^2+(7-5)^2=17$$

Persamaan bola:

$$(x-2)^2+(y-0)^2+(z-5)^2=17$$

Grafik di Ruang-Tiga

$$Ax + By + Cz + D = 0$$

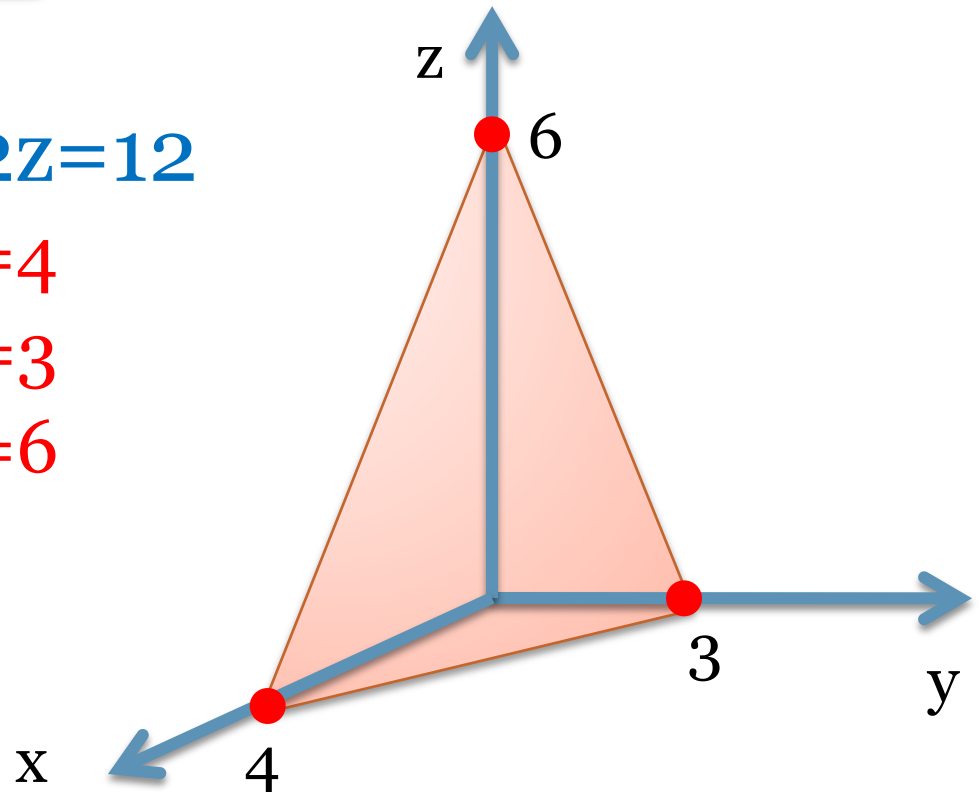
$$A^2 + B^2 + C^2 \neq 0$$

- Sketsa-lah : $3x + 4y + 2z = 12$

$$y=0; z=0; \rightarrow x=12/3=4$$

$$x=0; z=0; \rightarrow y=12/4=3$$

$$x=0; y=0; \rightarrow z=12/2=6$$



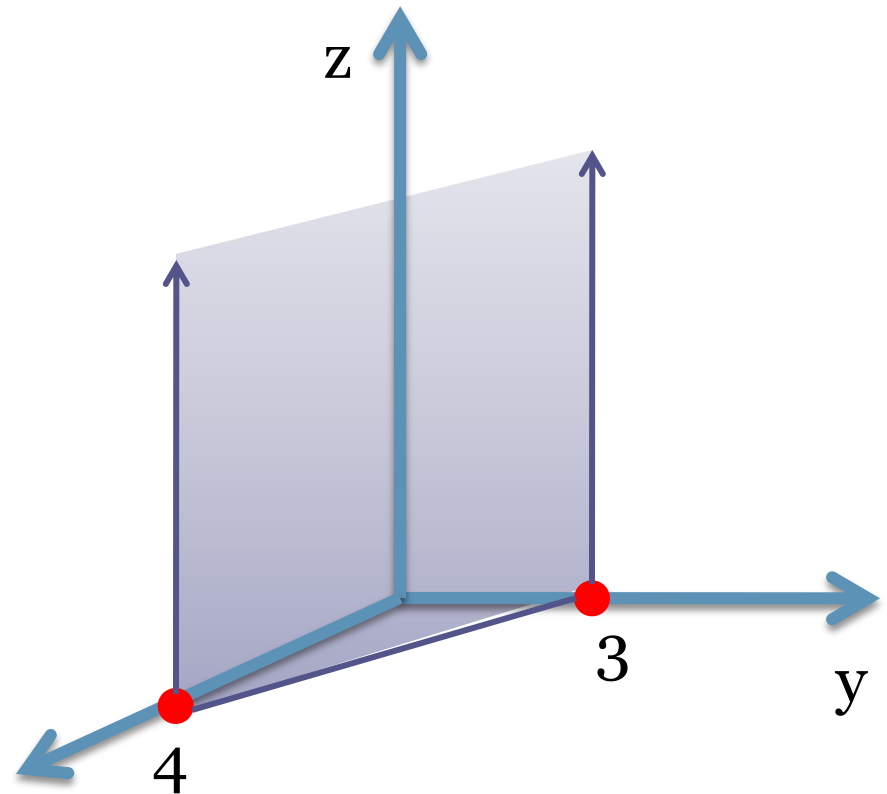
Batas tak hingga

- Sketsa-lah $3x+2y=12$

$$y=0; z=\infty; \rightarrow x=12/3=4$$

$$x=0; z=\infty; \rightarrow y=12/4=3$$

$$z=\infty$$



Latihan Soal

Soal Sitem Koordinat Ruang-Tiga