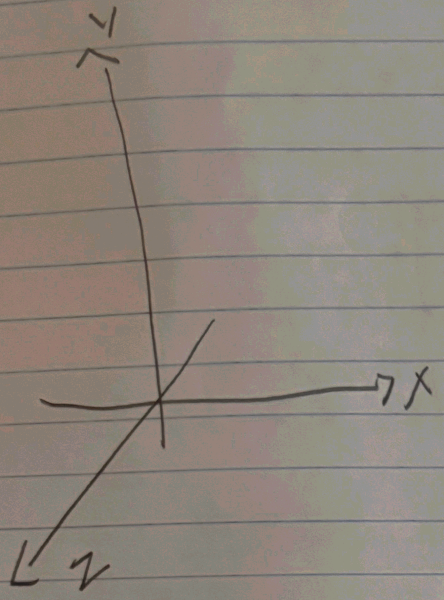
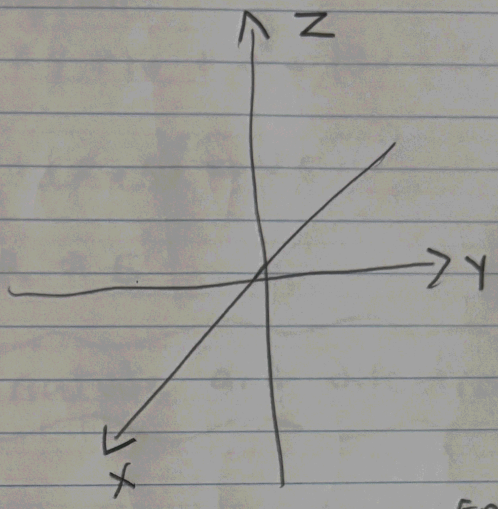
MATH

API 15

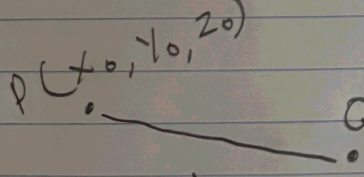


Right hand rule



more common form

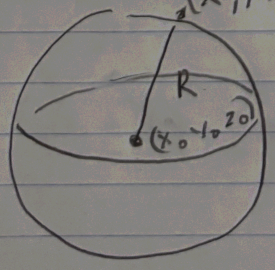
Distance



$$\text{distance} = \sqrt{(X_1 - X_0)^2 + (Y_1 - Y_0)^2 + (Z_1 - Z_0)^2}$$

$$\text{Mid Point} = \left(\left(\frac{X_0 + X_1}{2}\right), \left(\frac{Y_0 + Y_1}{2}\right), \left(\frac{Z_0 + Z_1}{2}\right)\right)$$

Spheres



$$\text{dist} = R = \sqrt{(X_1 - X_0)^2 + (Y_1 - Y_0)^2 + (Z_1 - Z_0)^2}$$

MATH Apr 15th

EXP:

$$x^2+y^2+z^2+4x-8y+10z+20=0$$

complete the square

$$x^2+4x+4+y^2-8y+16+z^2+10z+25=-20+4+16+25$$

simplify

$$(x+2)^2+(y-4)^2+(z+5)^2=25$$

conclude

center, $(-2,4,-5)$ $R=5$

Vectors {magnatude and direction}

If you change position without changing direction or magnitude it remains identical

$$\vec{PQ}=\mathbf{PQ}=\underline{PQ}$$

$$PQ=\langle x_1-x_0, y_1-y_0, z_1-z_0\rangle$$

Length (Magnitude) $= \|\vec{a}\|$

$$\|\vec{a}\|=\sqrt{a_1^2+a_2^2+a_3^2}$$

zero vector:

$\vec{0}=\langle 0,0,0\rangle \neq 0$ its a vector

$\|\vec{0}\|=0$

ADDition

$\vec{a}=\langle a_1, a_2, a_3\rangle$ $\vec{b}=\langle b_1, b_2, b_3\rangle$ $\vec{a}+\vec{b}=\vec{c}$

$\vec{c}=\langle (a_1+b_1), (a_2+b_2), (a_3+b_3)\rangle$

MATH

April 15th

Scalar Multiplacation

$\vec{a} = \langle a_1, a_2, a_3 \rangle$

$k\vec{a} = \langle ka_1, ka_2, ka_3 \rangle$

Unit Vector

in the direction $\vec{a}$

$$\vec{e}\,\vec{a} = \left(\langle a_1, a_2, a_3 \rangle \cdot \frac{1}{\|\vec{a}\|}\right)$$

↑ has a length of 1

Rules

1. $\vec{a} + \vec{b} = \vec{b} + \vec{a}$
2. $(\vec{a} + \vec{b}) + \vec{c} = \vec{a} + (\vec{b} + \vec{c})$
3. $k(\vec{a} + \vec{b}) = k\vec{a} + k\vec{b}$
4. $(k + l)\vec{a} = k\vec{a} + l\vec{a}$