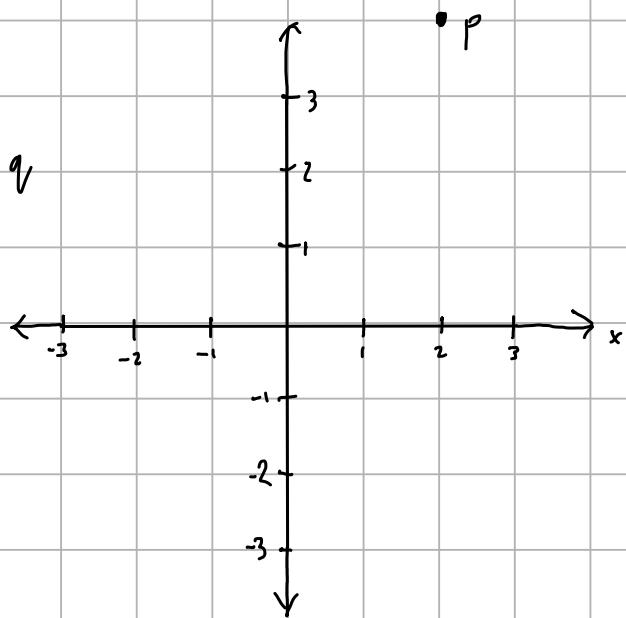


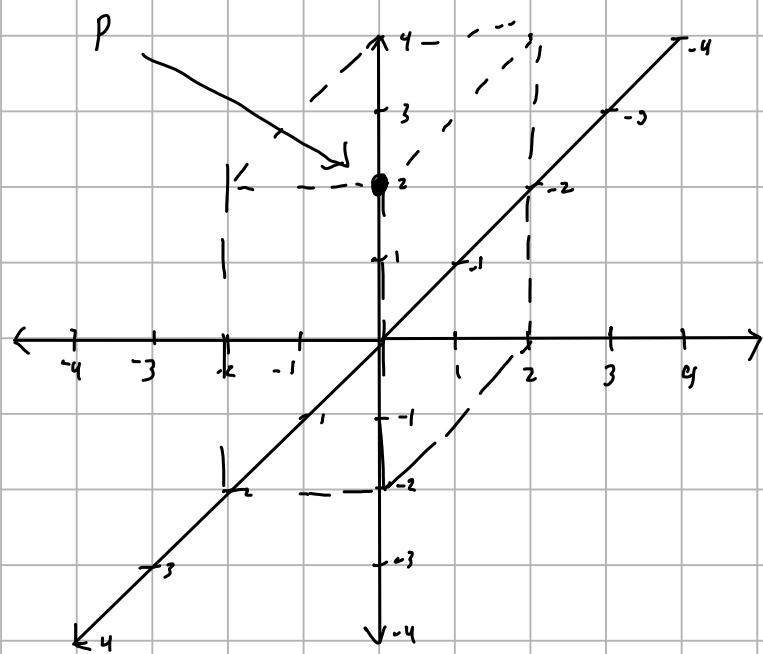
# Assignment 1

1) a)

b)



c)



d)

$$R_z = \begin{bmatrix} \cos\left(\frac{\pi}{2}\right) & -\sin\left(\frac{\pi}{2}\right) & 0 \\ \sin\left(\frac{\pi}{2}\right) & \cos\left(\frac{\pi}{2}\right) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$R_z(90^\circ)$

$$R_y = \begin{bmatrix} \cos\left(-\frac{\pi}{4}\right) & 0 & \sin\left(-\frac{\pi}{4}\right) \\ 0 & 1 & 0 \\ -\sin\left(-\frac{\pi}{4}\right) & 0 & \cos\left(-\frac{\pi}{4}\right) \end{bmatrix}$$

$R_y(-45^\circ)$

$$R = R_y \cdot R_z$$

$$R = \begin{bmatrix} \cos(-\frac{\pi}{4}) & 0 & \sin(-\frac{\pi}{4}) \\ 0 & 1 & 0 \\ -\sin(-\frac{\pi}{4}) & 0 & \cos(-\frac{\pi}{4}) \end{bmatrix} \begin{bmatrix} \cos(\frac{\pi}{2}) & -\sin(\frac{\pi}{2}) & 0 \\ \sin(\frac{\pi}{2}) & \cos(\frac{\pi}{2}) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$R = \boxed{\begin{bmatrix} \cos(-\frac{\pi}{4})\cos(\frac{\pi}{2}) & -\cos(-\frac{\pi}{4})\sin(\frac{\pi}{2}) & \sin(-\frac{\pi}{4}) \\ \sin(\frac{\pi}{2}) & \cos(\frac{\pi}{2}) & 0 \\ -\sin(-\frac{\pi}{4})\cos(\frac{\pi}{2}) & \sin(-\frac{\pi}{4})\sin(\frac{\pi}{2}) & \cos(-\frac{\pi}{4}) \end{bmatrix}}$$

e) a) is true. b) is false.