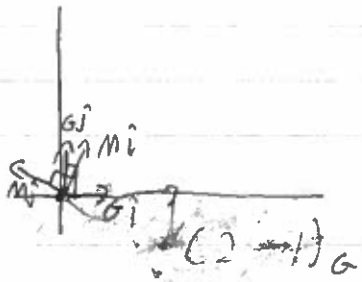
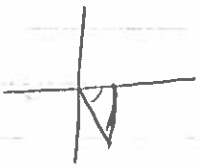
QEA Day 6

1)

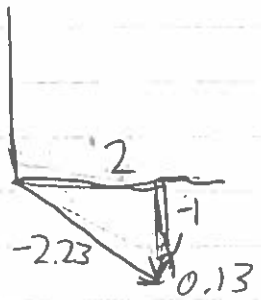
a)





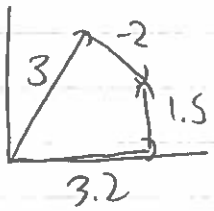
b)

$$\begin{pmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix} \begin{pmatrix} 2 \\ -1 \end{pmatrix} = \begin{pmatrix} 1 - \frac{\sqrt{3}}{2} \\ -\sqrt{3} - \frac{1}{2} \end{pmatrix} = \begin{pmatrix} 0,13 \\ -2.23 \end{pmatrix}$$



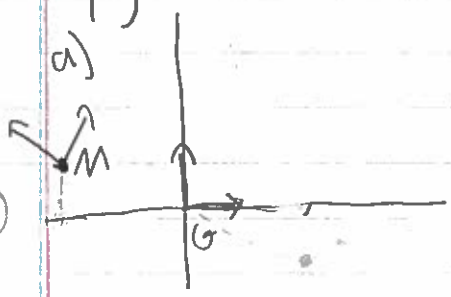
c)

$$\begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix} \begin{pmatrix} 3 \\ -2 \end{pmatrix} = \begin{pmatrix} \frac{3}{2} + \sqrt{3} \\ \frac{3\sqrt{3}}{2} - 1 \end{pmatrix} \approx \begin{pmatrix} 3.2 \\ 1.5 \end{pmatrix}$$

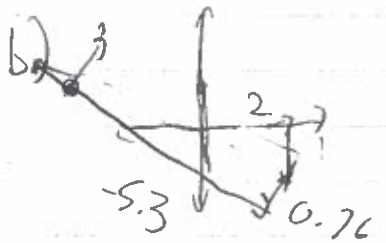


1)

a)

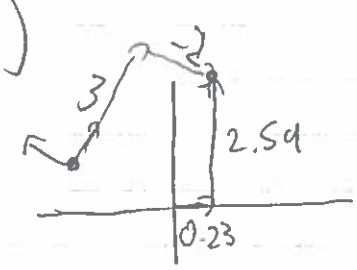


b)



$$\begin{bmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} & 0 \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 & 3 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix} = \begin{bmatrix} \frac{5}{2}-\sqrt{3} \\ -\frac{5\sqrt{3}}{2}-1 \\ 1 \end{bmatrix} \approx \begin{pmatrix} 0.76 \\ -5.3 \end{pmatrix}$$

c)



$$\begin{bmatrix} 1 & 0 & -3 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} & 0 \\ \frac{\sqrt{3}}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 3 \\ -2 \\ 1 \end{bmatrix} = \begin{bmatrix} -\frac{3}{2} & +\sqrt{3} \\ \frac{3\sqrt{3}}{2} \\ 1 \end{bmatrix} \approx$$

$$\begin{pmatrix} 0.23 \\ 2.59 \\ 1 \end{pmatrix}$$

1) $\begin{pmatrix} r\cos\theta \\ r\sin\theta \end{pmatrix}$

2) $\begin{pmatrix} r\cos\theta - d \\ r\sin\theta \end{pmatrix}$

3) $\begin{pmatrix} 1 & 0 & X_N \\ 0 & 1 & Y_N \\ 0 & 0 & 0 \end{pmatrix}\begin{pmatrix} \cos\phi & -\sin\phi & 0 \\ \sin\phi & \cos\phi & 0 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} r\cos\theta - d \\ r\sin\theta \\ 1 \end{pmatrix}\begin{pmatrix} 1 & \cdots \\ \vdots & \ddots \\ 1 & 1 \end{pmatrix}$

$$\begin{pmatrix} X_n - d\cos\phi + r\cos(\theta+\phi) \\ Y_n - d\sin\phi + r\sin(\theta+\phi) \\ 1 \end{pmatrix}$$