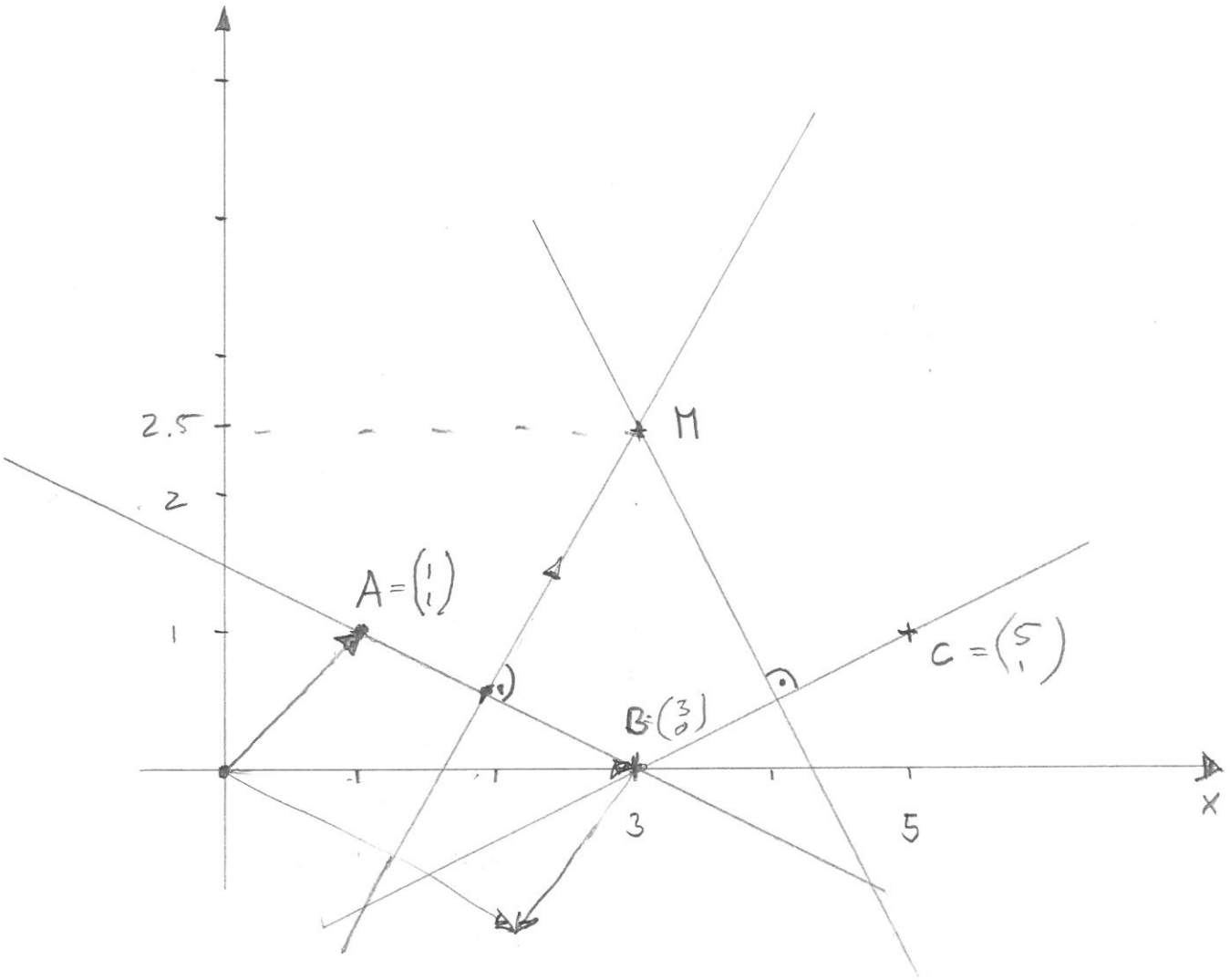
Comp 3320/6370

Exercise 1



$$\left\{x \in \mathbb{R}^2;\ x = A + \tfrac{1}{2}(B-A) + t\,(B-A)^{\perp}\right\} \cap \left\{x \in \mathbb{R}^2;\ x = B + \tfrac{1}{2}(C-B) + s(C-B)^{\perp}\right\}$$

$$\begin{pmatrix}1\\1\end{pmatrix} + \frac{1}{2}\begin{pmatrix}3-1\\0-1\end{pmatrix} + t\begin{pmatrix}2\\-1\end{pmatrix}^{\perp} = \begin{pmatrix}3\\0\end{pmatrix} + \frac{1}{2}\begin{pmatrix}5-3\\1-0\end{pmatrix} + s\begin{pmatrix}2\\1\end{pmatrix}^{\perp}$$

$$\begin{pmatrix}2\\0{,}5\end{pmatrix} + t\begin{pmatrix}1\\2\end{pmatrix} = \begin{pmatrix}4\\0{,}5\end{pmatrix} + s\begin{pmatrix}-1\\2\end{pmatrix}$$

$$\Rightarrow \begin{array}{rl} 2 - t - s &= 0 \\ 0 - 2t + 2s &= 0 \end{array} \Bigg\} \begin{array}{c} 2 - t - s = 0 \\ s = t \end{array} \Bigg\} \quad 2 - 2t = 0 \Rightarrow \underline{t = 1}$$

$$\Rightarrow M = \begin{pmatrix}3\\2.5\end{pmatrix}$$