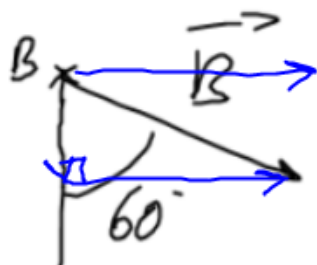


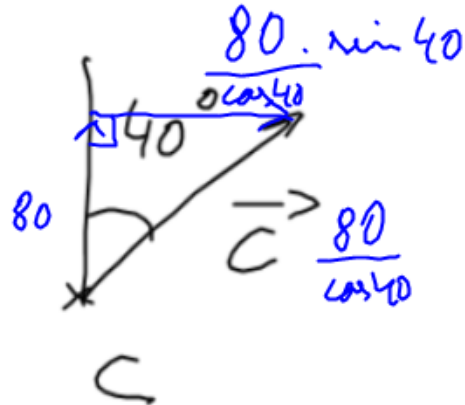
$$\|\vec{A}\| = 240 \text{ N}$$

$$\vec{A} = \begin{pmatrix} -240 \cdot \sin 15 \\ 240 \cdot \cos 15 \\ 0 \end{pmatrix} = \begin{pmatrix} \text{lightning bolt} \\ \text{lightning bolt} \\ 0 \end{pmatrix}$$



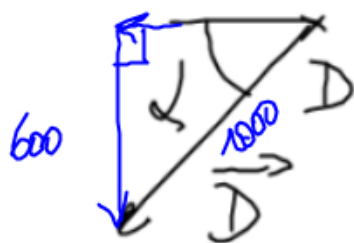
$$\|\vec{B}\| = 120 \text{ N}$$

$$\vec{B} = \begin{pmatrix} 120 \sin 60 \\ -120 \cos 60 \\ 0 \end{pmatrix} = \begin{pmatrix} \text{lightning bolt} \\ \text{lightning bolt} \\ 0 \end{pmatrix}$$



$$\|\vec{C}\| = \frac{80}{\cos 40}$$

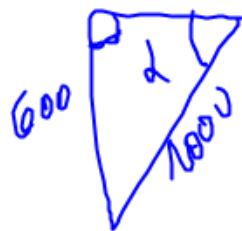
$$\vec{C} = \begin{pmatrix} 80 \tan 40 \\ 80 \\ 0 \end{pmatrix}$$

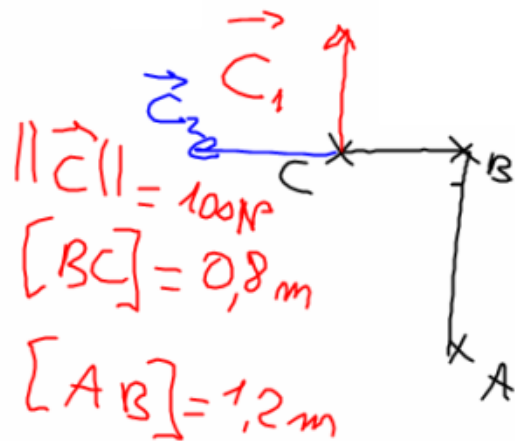


$$\|\vec{D}\| = 1000 \text{ N}$$

$$\vec{D} = \begin{pmatrix} -1000 \cos 36.9 \\ -600 \\ 0 \end{pmatrix} = \begin{pmatrix} \text{lightning bolt} \\ \text{lightning bolt} \\ 0 \end{pmatrix}$$

$$\alpha = \sin^{-1} \left( \frac{600}{1000} \right) = \begin{pmatrix} \text{lightning bolt} \\ \text{lightning bolt} \\ 0 \end{pmatrix} \approx 36.9^\circ$$





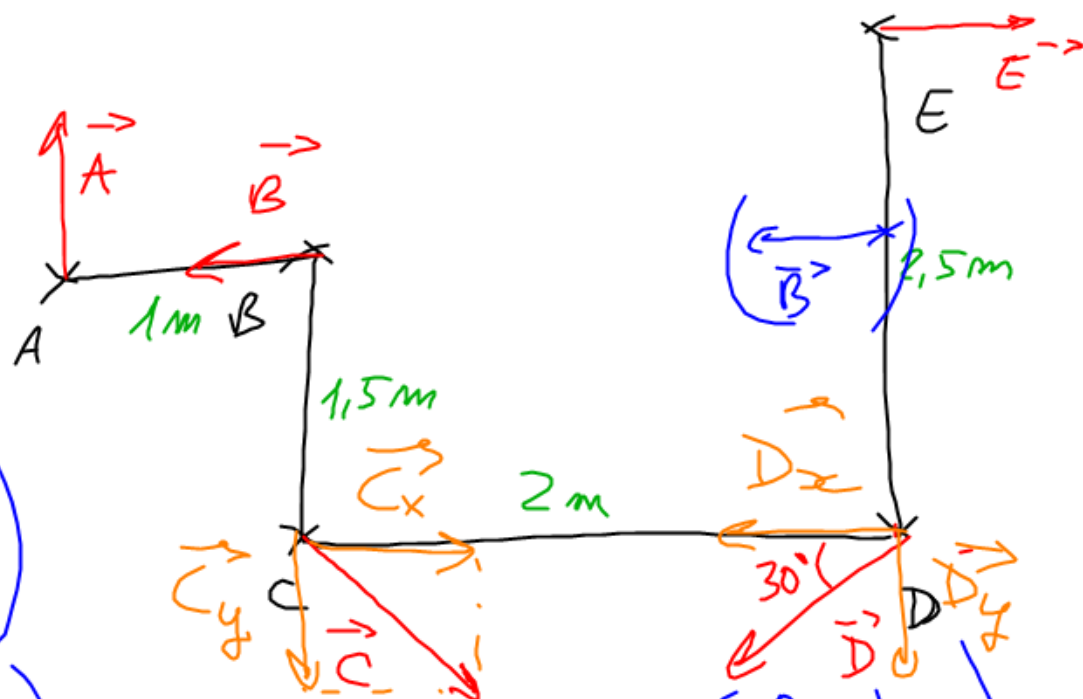
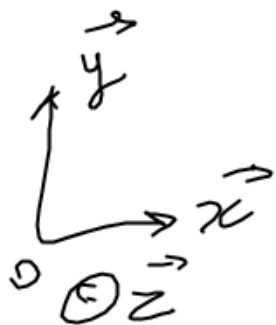
$$\|\vec{M}_{AC_1}\| = 100 \cdot 0,8 = 80\text{ Nm}$$

$$\vec{M}_{AC_1} = \begin{pmatrix} 0 \\ 0 \\ -80 \end{pmatrix}$$

$$\vec{M}_B C_1 = \vec{M}_A C_1$$

$$\|\vec{M}_{AC_2}\| = 100 \cdot 1,2 = 120\text{ Nm}$$

$$\vec{M}_{AC_2} = \begin{pmatrix} 0 \\ 0 \\ +120 \end{pmatrix}$$



$$\vec{M}_E A = \begin{pmatrix} 0 \\ 0 \\ -100 \cdot 3 \end{pmatrix}$$

$$\vec{M}_E B = \begin{pmatrix} 0 \\ 0 \\ -60 \cdot 1 \end{pmatrix}$$

$$\vec{M}_E E = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

$$\vec{C}_x = \begin{pmatrix} 50 \\ 0 \\ 0 \end{pmatrix} \quad \vec{C}_y = \begin{pmatrix} 0 \\ -40 \\ 0 \end{pmatrix}$$

les dessiner sur le schéma

$$\vec{M}_E C = \begin{pmatrix} \vec{M}_E C_x & 0 & \vec{M}_E C_y \\ 50 \cdot 2,5 + 40 \cdot 2 \end{pmatrix}$$

$$\|\vec{A}\| = 100 \text{ N}$$

$$\|\vec{B}\| = 60 \text{ N}$$

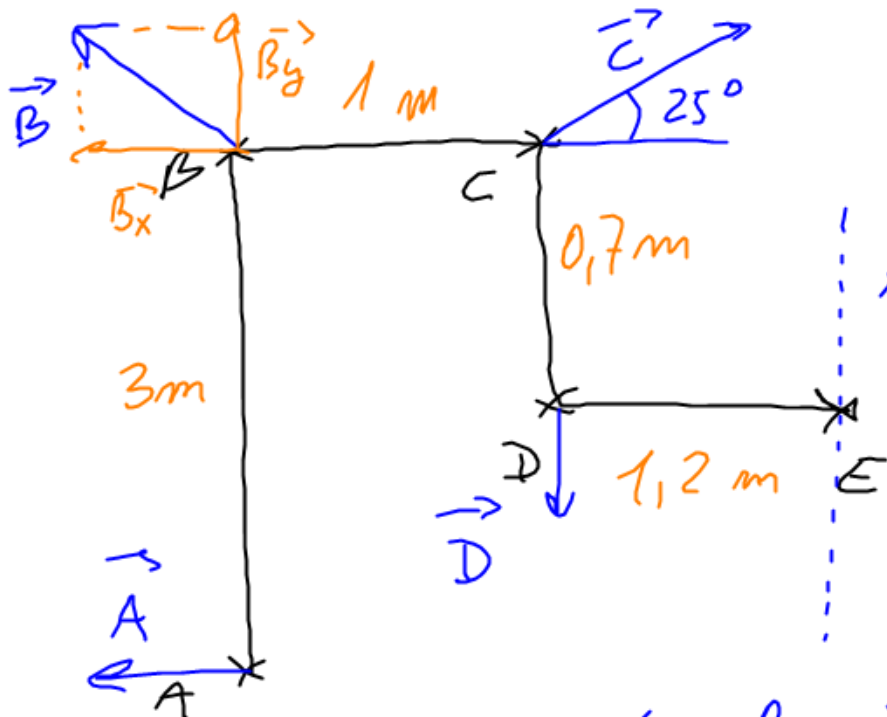
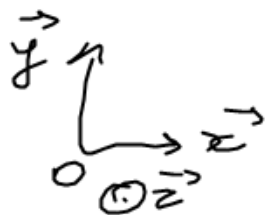
$$\vec{C} = \begin{pmatrix} 50 \\ -40 \\ 0 \end{pmatrix}$$

$$\|\vec{D}\| = 80 \text{ N}$$

$$\|\vec{E}\| = 20 \text{ N}$$

$$\vec{D} = \begin{pmatrix} -80 \cos 30 \\ -80 \sin 30 \\ 0 \end{pmatrix}$$

$$\vec{M}_E D = \begin{pmatrix} 0 \\ 0 \\ -80 \cos 30 \cdot 2,5 \end{pmatrix}$$



$$\vec{M}_A A =$$

$$\vec{M}_A B = \begin{pmatrix} 0 \\ 0 \\ 80 \cdot 3 \end{pmatrix}$$

$$\vec{M}_A C = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$\vec{M}_A D = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

Si  $\vec{M}_A E = 3600 \text{ N}\cdot\text{m}$  et  $\vec{M}_A E \cdot \vec{z} > 0$  alors  $\|\vec{E}\| =$

$$\text{et } \vec{E} = \begin{pmatrix} \end{pmatrix}$$

$$\|\vec{A}\| = 100 \text{ N}$$

$$\vec{B} = \begin{pmatrix} -80 \\ 80 \\ 0 \end{pmatrix}$$

$$\|\vec{C}\| = 200 \text{ N}$$

$$\|\vec{D}\| = 150 \text{ N}$$