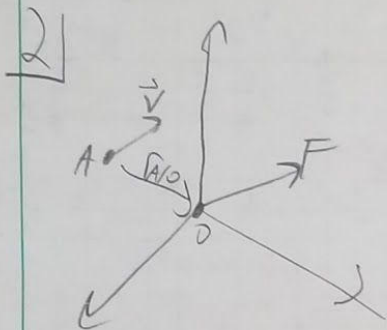
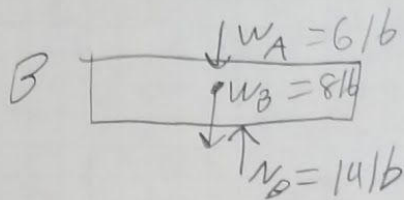


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$$\begin{aligned} a) \quad \vec{M}_A &= \vec{r}_{AO} \times \vec{F} \\ &= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & -2 & -2 \\ 3 & 3 & -1 \end{vmatrix} \end{aligned}$$

$$\vec{M}_A = (2+6)\hat{i} - (0-(-6))\hat{j} + (0-(-6))\hat{k}$$

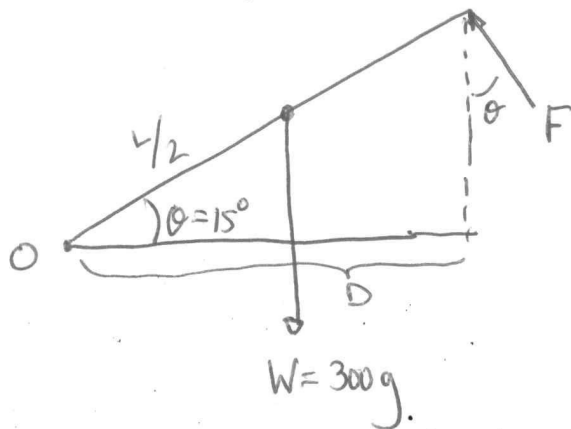
$$\boxed{\vec{M}_A = 8\hat{i} - 6\hat{j} + 6\hat{k}}$$

$$\begin{aligned} b) \quad M_{A/V} &= \hat{v} \cdot \vec{M}_A \\ &= \frac{1}{\sqrt{2}}(\hat{i} - \hat{k}) \cdot (8\hat{i} - 6\hat{j} + 6\hat{k}) \end{aligned}$$

$$M_{A/V} = \frac{6}{\sqrt{2}} - \frac{6}{\sqrt{2}} = \frac{12}{\sqrt{2}}$$

$$\boxed{M_{A/V} = \frac{12}{\sqrt{2}} = 8.49}$$

(3)



$$\Sigma M_O = 0 = -W\left(\frac{L}{2} \cos \theta\right) + D\left(\frac{F}{\cos \theta}\right)$$

$$\Rightarrow F = \frac{WL}{2D} \cos^2 \theta$$

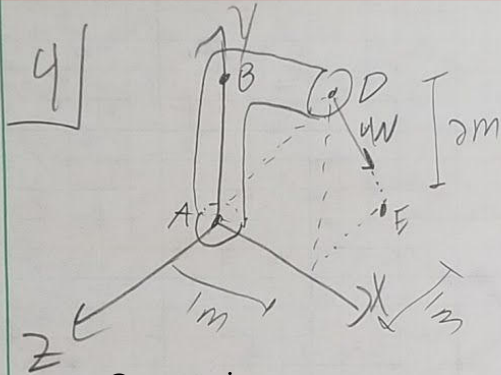
Use  $W = 300 \cdot g$ ,  $g = 9.81$ ,  $L = 10$ ,  $D = 9$ ,  $\theta = 15^\circ$

$$\Rightarrow \boxed{F = 1525.5 \text{ N}}$$

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Correction:  
any "sqrt(3)" should be  
"sqrt(5)"

$$F = 4 \cdot \frac{1}{\sqrt{3}} (-2\hat{j} - 1\hat{k})$$

$$\vec{F} = \frac{8}{\sqrt{3}} \hat{j} - \frac{4}{\sqrt{3}} \hat{k}$$

$$\vec{M} = \vec{r}_{AD} \times \vec{F}$$

$$= \frac{4}{\sqrt{3}} \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2 & 0 \\ 0 & 2 & -1 \end{vmatrix}$$

$$= \frac{4}{\sqrt{3}} (-2\hat{i} - (-1)\hat{j} + (-2\hat{k}))$$

$$\vec{M} = -\frac{8}{\sqrt{3}} \hat{i} + \frac{4}{\sqrt{3}} \hat{j} - \frac{8}{\sqrt{3}} \hat{k}$$

- 5.) a.) no  
b.) yes  
c.) yes  
d.) no

