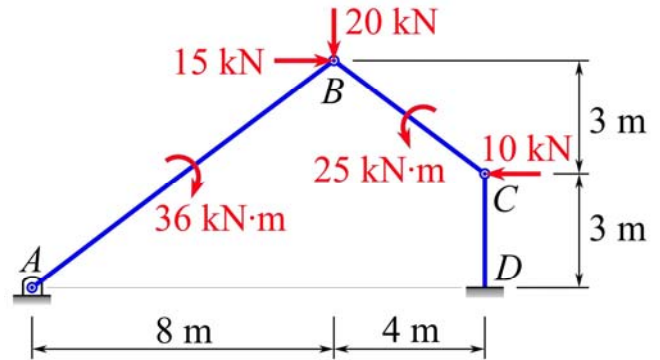
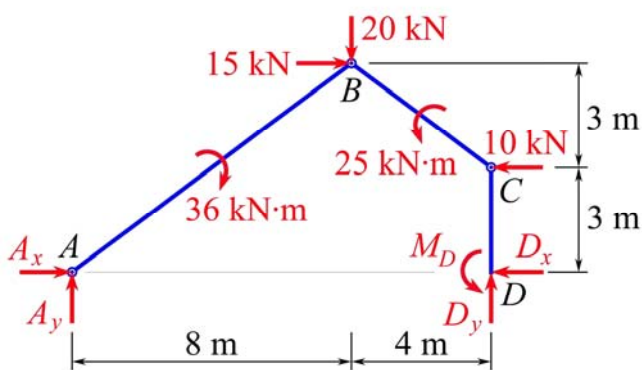


MEEG 2003 Quiz #10.m18

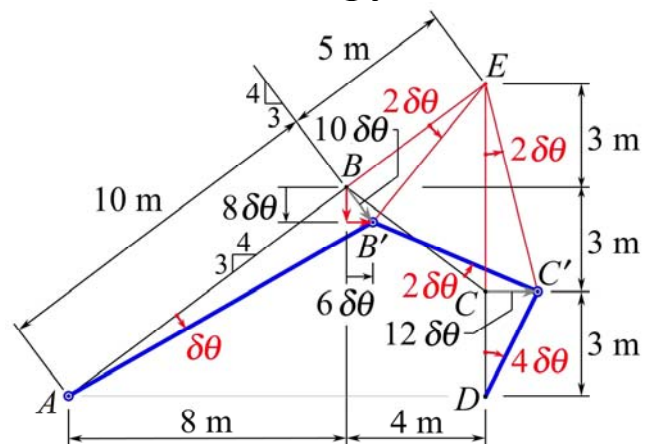
A frame is loaded as shown. Using virtual work method, determine the reaction moment M_D at the fixed support D . (Include the three major steps in your solution.)



We first draw the *FBD* and *VDD* with a strategy as follows:



③



④

Then, we set $\delta U = 0$ to get

$$36(\delta\theta) + 15(6\delta\theta) + 20(8\delta\theta) + 25(2\delta\theta) + 10(-12\delta\theta) + M_D(-4\delta\theta) = 0$$

$$M_D = 54$$

$$\mathbf{M_D = 54 \text{ kN}\cdot\text{m} \curvearrowright} \quad \text{③}$$