A frame is loaded as shown. Using *virtual work method*, determine *(a)* the horizontal reaction force $\mathbf{A}_x$ at the fixed support A, *(b)* the vertical reaction force $\mathbf{D}_y$ at the hinge support D. (Include the *FBD* for the entire system and separate *VDD's* with strategies for finding $\mathbf{A}_x$ and $\mathbf{D}_y$, respectively, in your solution.)
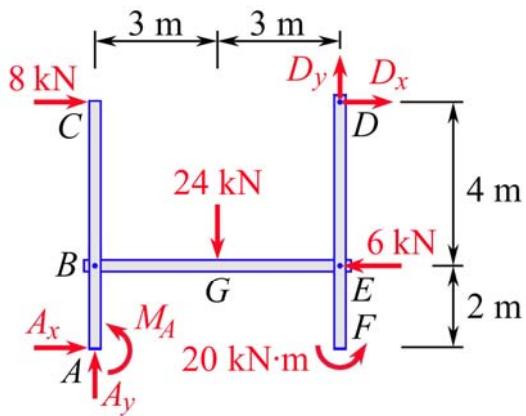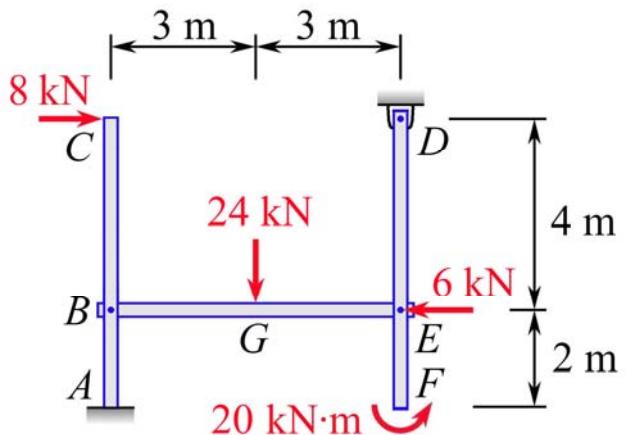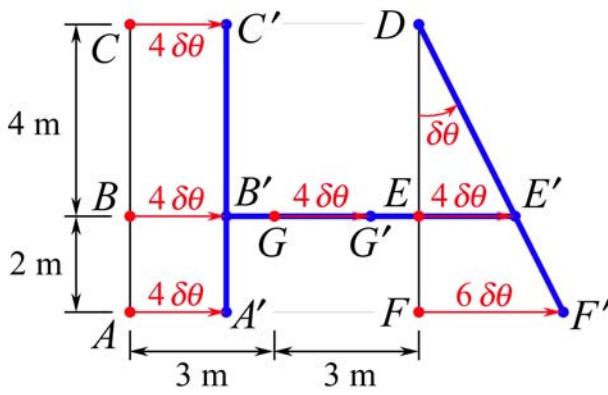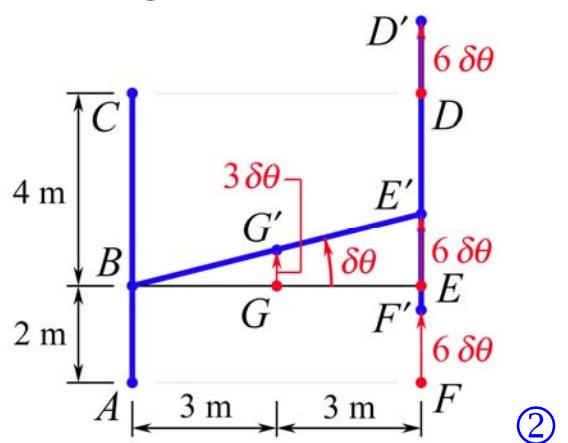
$$\delta U = 0: \quad A_x(4\,\delta\theta) + 8(4\,\delta\theta) + 6(-4\,\delta\theta) + 20(\delta\theta) = 0$$

$$A_x = -7 \qquad \mathbf{A}_x = 7 \text{ kN} \leftarrow \quad ②$$

$$\delta U = 0: \quad D_y(6\,\delta\theta) + 24(-3\,\delta\theta) = 0$$

$$D_y = 12 \qquad \mathbf{D}_y = 12 \text{ kN} \uparrow \quad ②$$