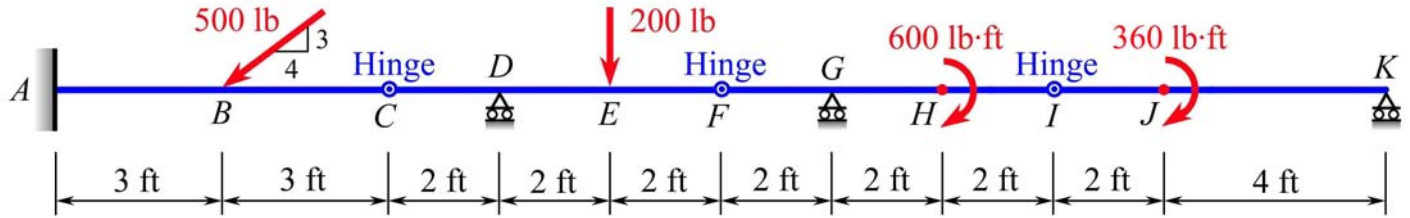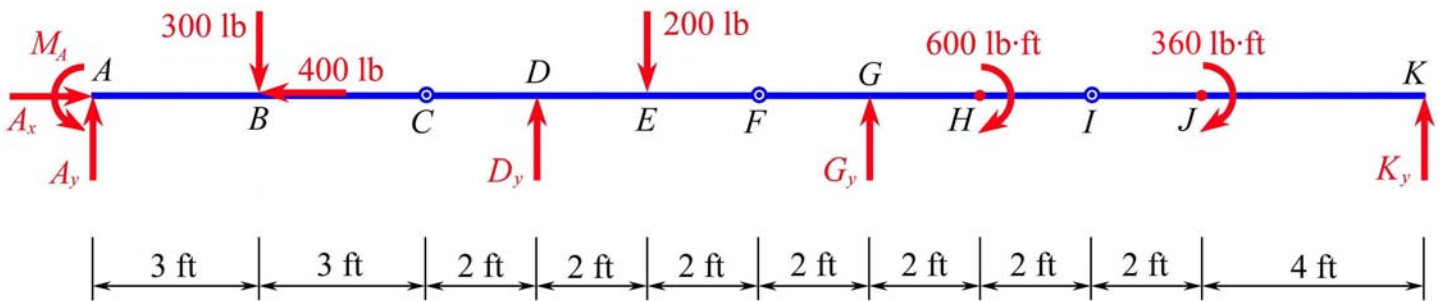# Quiz #10. Using the virtual work method, determine the vertical reaction force $A_y$ at the fixed support $A$ of the *Gerber beam* shown.
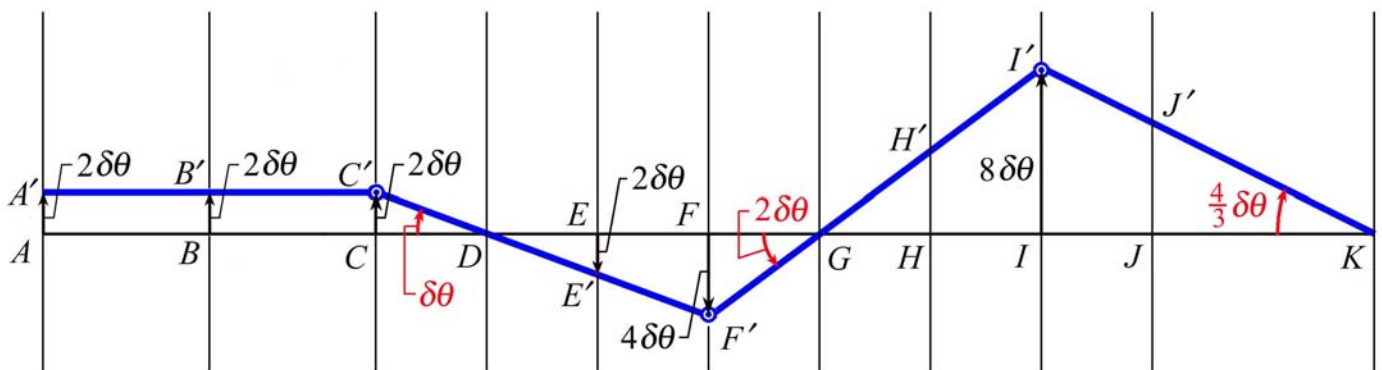


## Solution.

### Step 1: We draw the *FBD* for the beam.



### Step 2: We draw the *VDD* for the beam with a **strategy** to involve $A_y$ in the total virtual work done.



### Step 3: We set $\delta U = 0$.

$$A_y(2\,\delta\theta) + 300(-2\,\delta\theta) + 200(2\,\delta\theta) + 600(-2\,\delta\theta) + 360\left(\tfrac{4}{3}\delta\theta\right) = 0$$

$$A_y = 460 \qquad\qquad \boxed{A_y = 460 \text{ lb} \uparrow}$$