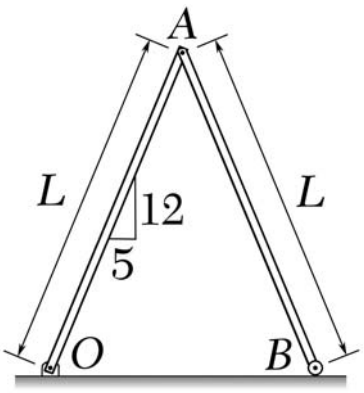
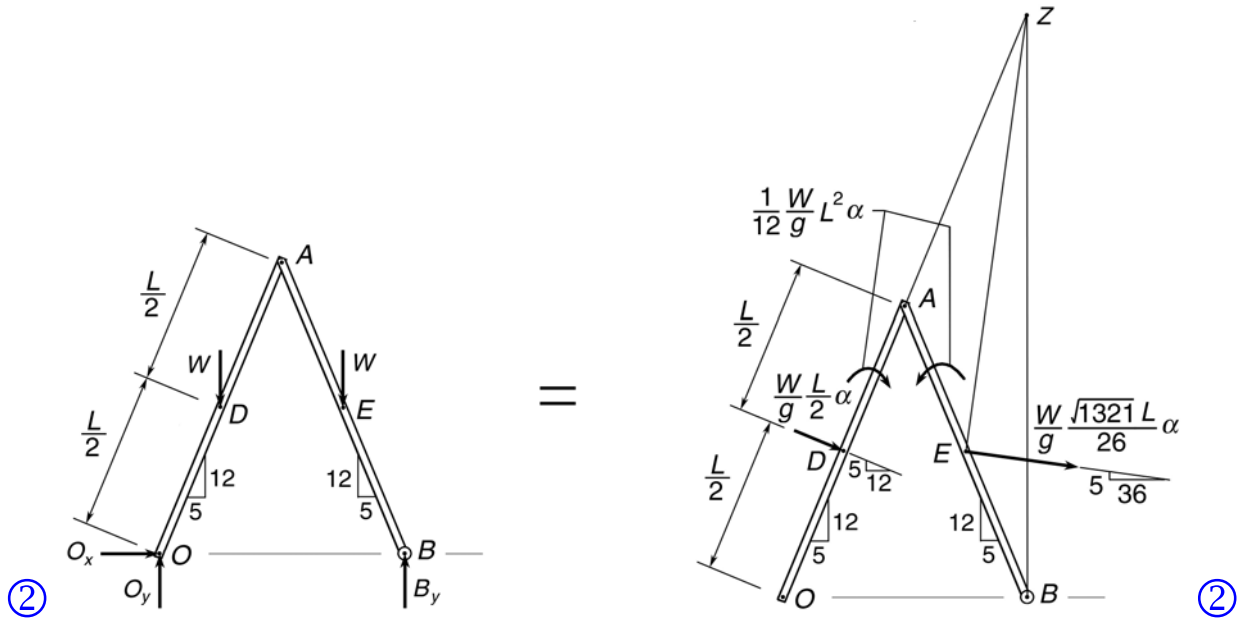
Quiz #7 The slender bars *OA* and *AB*, each having a weight *W*, are released from rest in the position shown. Using method of virtual work in kinetics, determine the length *L* of the bars in feet if, upon release from rest, bar *OA* has $\boldsymbol{\alpha}_{OA} = 1.5$ rad/s^2 ↻.





By symmetry, $\boldsymbol{\alpha}_{OA} = -\boldsymbol{\alpha}_{AB}$. Thus, we may let $\alpha_{OA} = \alpha_{AB} = \alpha$.

$$W\left(\frac{5L}{26}\delta\theta\right)(2) = \frac{W}{g}\left(\frac{L}{2}\alpha\right)\left(\frac{L}{2}\delta\theta\right) + \frac{W}{g}\left(\frac{\sqrt{1321}L}{26}\alpha\right)\left(\frac{\sqrt{1321}L}{26}\delta\theta\right) + \frac{1}{12}\frac{W}{g}L^2\alpha(\delta\theta)(2) \quad ②$$

$$L = \frac{195\,g}{1202\,\alpha} = \frac{195\,(32.2)}{1202\,(1.5)} = 3.483$$

$$L = 3.48 \text{ ft} \quad ①$$