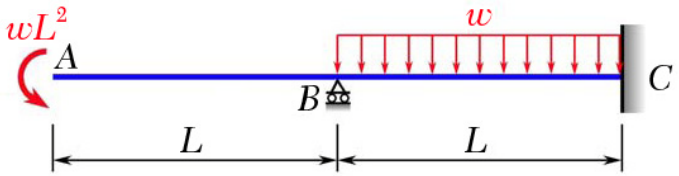
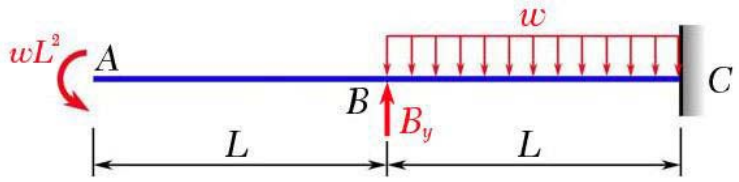
MEEG 3013 Quiz #9b

A beam with constant flexural rigidity *EI* is supported and loaded as shown. Using **method of model formulas**, determine for this beam (*a*) the reaction $\mathbf{B}_y$ at *B*, (*b*) the slope θ_A at *A*, (*c*) the deflection y_A at *A*.





①

Eq. (3): $0 = \theta_A + \dfrac{-wL^2(2L)}{EI} - \dfrac{-B_y L^2}{2EI} - \dfrac{wL^3}{6EI}$

Eq. (4): $0 = y_A + \theta_A(2L) + \dfrac{-wL^2(2L)^2}{2EI} - \dfrac{-B_y L^3}{6EI} - \dfrac{wL^4}{24EI}$ ⑥

Eq. (2): $0 = y_A + \theta_A L + \dfrac{-wL^4}{2EI}$

Solution of the above three simultaneous equations yield:

$B_y = \dfrac{15wL}{8}$ $\quad \mathbf{B}_y = \dfrac{15wL}{8} \uparrow$ ① $\quad \theta_A = \dfrac{59wL^3}{48EI}$ ① $\quad y_A = -\dfrac{35wL^4}{48EI}$ ①