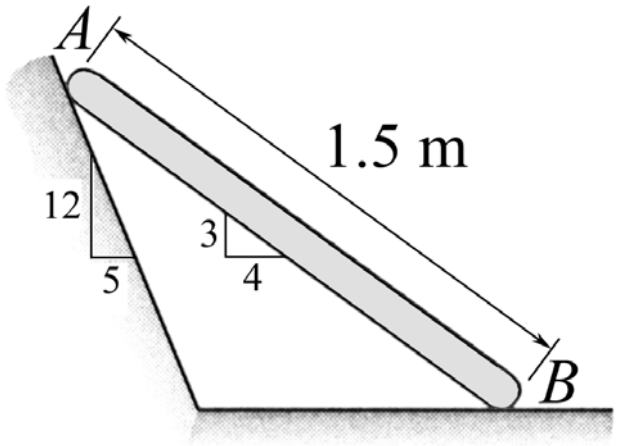
MEEG 2013 Quiz #5.m15.072

A. (2 points) Define *effective force*.

B. (8 points) The end B of the rod AB slides with the velocity $\mathbf{v}_B = 4.2$ m/s $\rightarrow$. For the position shown, determine the angular velocity $\boldsymbol{\omega}$ of the rod and the velocity $\mathbf{v}_A$ of the end A.



B. $\mathbf{v}_B = \mathbf{v}_{B/A} + \mathbf{v}_A$: ②

$$\left[\begin{array}{c} 4.2 \\ B \rightarrow \end{array}\right] = \left[\begin{array}{c} A \\ 3 \\ 4 \\ B \end{array}\right] \begin{array}{c} 1.5\omega \\ 4 \\ 3 \end{array} + \left[\begin{array}{c} A \\ 12 \\ 5 \end{array}\right] v_A \qquad ②$$

$$\pm\rightarrow \Sigma V_x: \quad 4.2 = \tfrac{3}{5}(1.5\omega) + \tfrac{5}{13} v_A \qquad ②$$

$$+\uparrow \Sigma V_y: \quad 0 = \tfrac{4}{5}(1.5\omega) - \tfrac{12}{13} v_A \qquad ②$$

$$\omega = 3 \qquad v_A = 3.9$$

$$\boldsymbol{\omega} = 3 \text{ rad/s } \circlearrowleft \qquad ①$$

$\mathbf{v}_A = 1.5\,\mathbf{i} - 3.6\,\mathbf{j}$ m/s or $\mathbf{v}_A = 3.9$ m/s $\measuredangle$ 292.6° ①