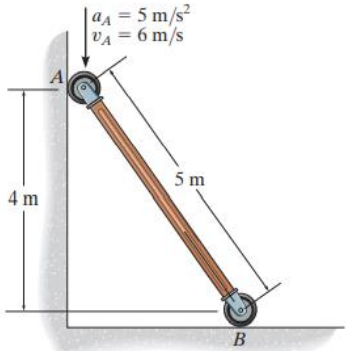
Upload a copy of your completed homework to uLearn AND turn in a physical copy in class. For full credit, you must show your work at how you arrived at the answer

1. Determine the rod's angular acceleration and the acceleration of point B.

   ans = $\boldsymbol{\alpha = -3.67\frac{rad}{s^2}}$ $\quad \boldsymbol{a_b = -26.7\ m/s^2}$



F16–19.

$$\omega = \frac{v_A}{r_{A/IC}} = \frac{6}{3} = 2 \text{ rad/s}$$

$$\mathbf{a}_B = \mathbf{a}_A + \boldsymbol{\alpha} \times \mathbf{r}_{B/A} - \omega^2 \mathbf{r}_{B/A}$$

$$a_B\mathbf{i} = -5\mathbf{j} + (\alpha\mathbf{k}) \times (3\mathbf{i} - 4\mathbf{j}) - 2^2(3\mathbf{i} - 4\mathbf{j})$$

$$a_B\mathbf{i} = (4\alpha - 12)\mathbf{i} + (3\alpha + 11)\mathbf{j}$$

$$a_B = 4\alpha - 12$$

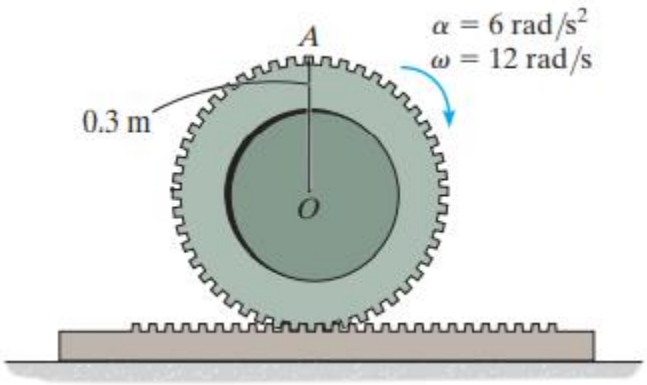
$$0 = 3\alpha + 11$$

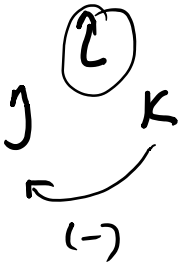
$$\alpha = -3.67 \text{ rad/s}^2 \quad \textit{Ans.}$$

$$a_B = -26.7 \text{ m/s}^2 \quad \textit{Ans.}$$

2. A gear rolls on a rack (no slipping) that is not moving with an angular velocity ω = 12 rad/s and angular acceleration α = 6 rad/s^2. Calculate the acceleration of Point A.

   Ans: 3.6**i** -43.2**j** **m/s^2**





0.3j

F16–20. $\mathbf{a}_A = \mathbf{a}_O + \boldsymbol{\alpha} \times \mathbf{r}_{A/O} - \omega^2 \mathbf{r}_{A/O}$ *Ans.*

$= 1.8\mathbf{i} + (-6\mathbf{k}) \times (0.3\mathbf{i}) - 12^2(0.3\mathbf{j})$

$= \{3.6\mathbf{i} - 43.2\mathbf{j}\}\ \text{m/s}^2$ *Ans.*