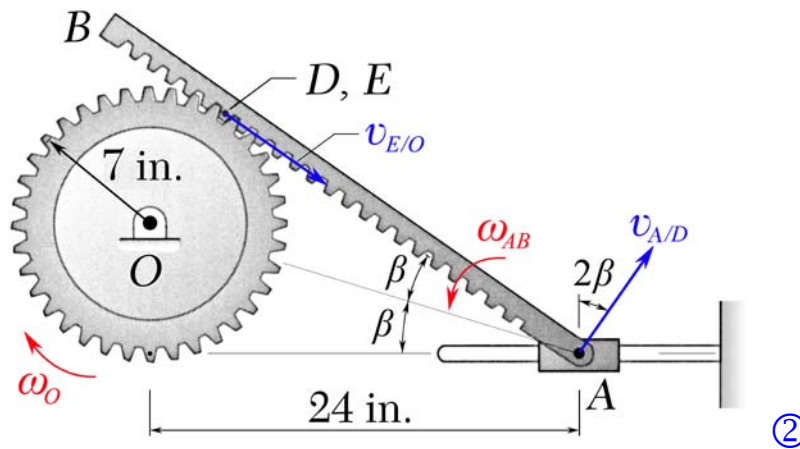
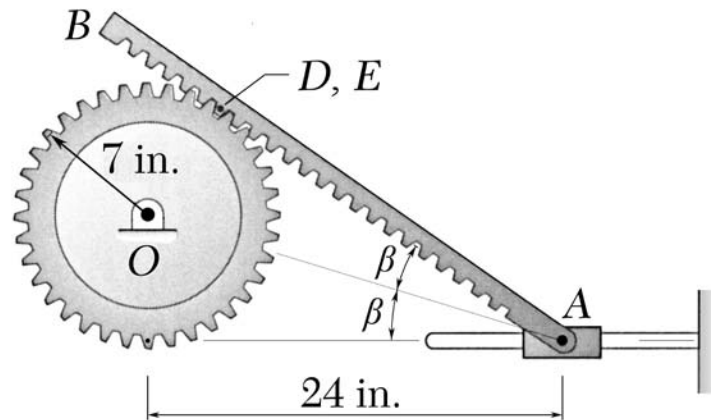


MEEG 4003 [Quiz #15.m11.smuq.093](#)

⑩ The end A of the rack AB moves with a constant velocity of 17.5 in./s \rightarrow . For the instant shown, determine the angular velocities ω_{AB} of AB and ω_O of the gear.



$$\mathbf{v}_A = 17.5 \text{ in./s } \rightarrow \quad \beta = \tan^{-1}(7/24) = 16.2602^\circ \quad \mathbf{v}_D = \mathbf{v}_E$$

$$\mathbf{v}_A = \mathbf{v}_{A/D} + \mathbf{v}_{E/O} \quad \text{②}$$

$$17.5\mathbf{i} = 24 \omega_{AB} (\sin 2\beta\mathbf{i} + \cos 2\beta\mathbf{j}) + 7 \omega_O (\cos 2\beta\mathbf{i} - \sin 2\beta\mathbf{j}) \quad \text{②}$$

$$\omega_{AB} = \frac{17.5 \sin 2\beta}{24} = 0.392 \quad \omega_O = \frac{24 \omega_{AB}}{7 \tan 2\beta} = 2.108$$

$$\omega_{AB} = 0.392 \text{ rad/s } \curvearrowright \quad \text{②}$$

$$\omega_O = 2.11 \text{ rad/s } \curvearrowright \quad \text{②}$$