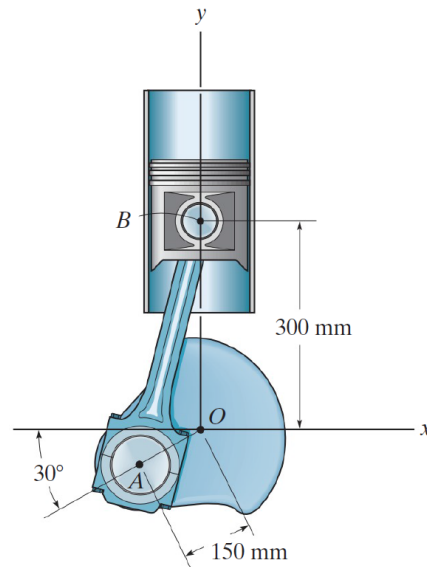


Problem 2-86

Determine the length of the connecting rod AB by first formulating a Cartesian position vector from A to B and then determining its magnitude.



Prob. 2-86

Solution

Write the position vectors to points A and B in component form.

$$\mathbf{r}_A = 150 \langle -\cos 30^\circ, -\sin 30^\circ \rangle \text{ mm}$$

$$\mathbf{r}_B = 300 \langle 0, 1 \rangle \text{ mm}$$

The position vector from A to B is therefore

$$\begin{aligned} \mathbf{r}_{AB} &= \mathbf{r}_B - \mathbf{r}_A \\ &= \langle 150 \cos 30^\circ, 300 + 150 \sin 30^\circ \rangle \text{ mm}, \end{aligned}$$

and its magnitude is

$$\begin{aligned} |\mathbf{r}_{AB}| &= \sqrt{(150 \cos 30^\circ)^2 + (300 + 150 \sin 30^\circ)^2} \text{ mm} \\ &\approx 397 \text{ mm}. \end{aligned}$$