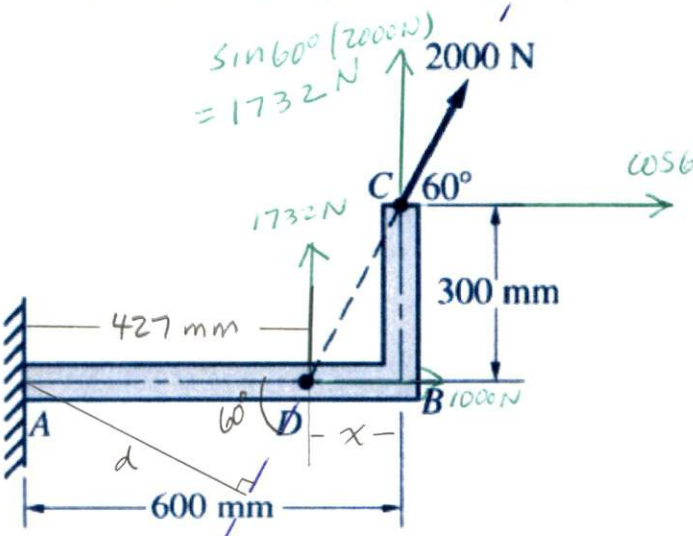
2-33

Determine the moment of the 2000-N force shown about A by (a) using the definition directly, (b) resolving the force into horizontal and vertical components at C, and (c) resolving the force into components at D.

Solution.



$\sin 60°\,(2000\,N) = 1732\,N$

$\cos 60°\,(2000\,N) = 1000\,N$

ccw +M ↺

cw −M ↻

(a) using definition

$$\tan 60° = \frac{300\,mm}{x}$$

$$x = \frac{300\,mm}{\tan 60°} = 173\,mm$$

$$\sin 60° = \frac{d}{427\,mm}$$

$$d = 427\,mm\,(\sin 60°) = 370\,mm$$

$$M_A = +2000\,N\,(370\,mm)$$

$$= 740\,N\cdot m \;\circlearrowleft$$

(b) Resolve @ C

$$M_A = -1000\,N\,(300\,mm) + 1732\,N\,(600\,mm)$$

$$= -300\,N\cdot m + 1039\,N\cdot m$$

$$= +739\,N\cdot M \;\circlearrowleft$$

(c) Resolve @ D

$$M_A = 1732\,N\,(427\,mm) = 740\,N\cdot m \;\circlearrowleft$$