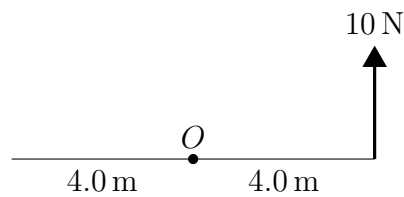


# Moments ANSWERS

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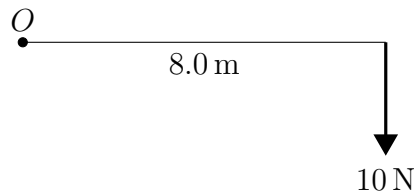
1. Calculate the moments of the forces about  $O$  in each of the following cases.

(a)



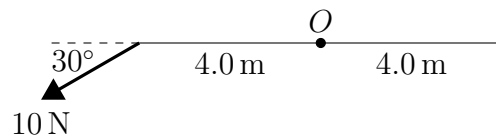
$$\begin{aligned} M &= F \times d \\ &= 10 \text{ N} \times 4.0 \text{ m} \\ &= 40 \text{ N m } \curvearrowright . \end{aligned}$$

(b)



$$\begin{aligned} M &= F \times d \\ &= 10 \text{ N} \times 8.0 \text{ m} \\ &= 80 \text{ N m } \curvearrowright . \end{aligned}$$

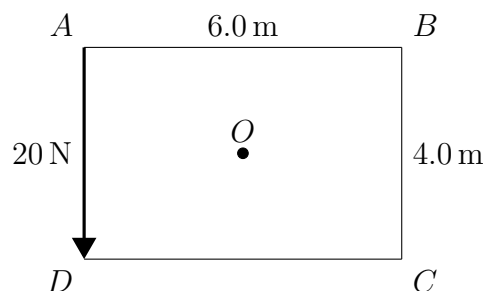
(c)



$$\begin{aligned} M &= F \times d \\ &= 10 \text{ N} \times 4.0 \text{ m} \times \sin(30^\circ) \\ &= 20 \text{ N m } \curvearrowright . \end{aligned}$$

2. Find the moment of a 20 N force about  $O$  (where  $O$  is the centre of the rectangle) when the force acts

(a) along  $AD$  (as shown),



$$\begin{aligned} M &= F \times d \\ &= 20 \text{ N} \times 3.0 \text{ m} \\ &= 60 \text{ N m } \curvearrowright . \end{aligned}$$

(b) along  $DC$ ,

$$\begin{aligned} M &= F \times d \\ &= 20 \text{ N} \times 2.0 \text{ m} \\ &= 40 \text{ N m } \odot . \end{aligned}$$

(c) along a line joining  $BD$ .

$$\begin{aligned} M &= F \times d \\ &= 20 \text{ N} \times 0.0 \text{ m} \\ &= 0 \text{ N m}. \end{aligned}$$

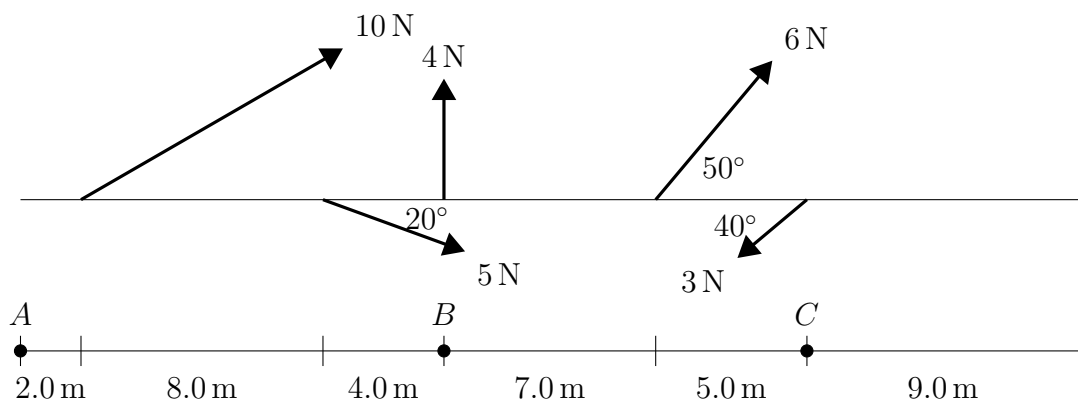
3. Calculate the resultant moment about

(a)  $A$ ,

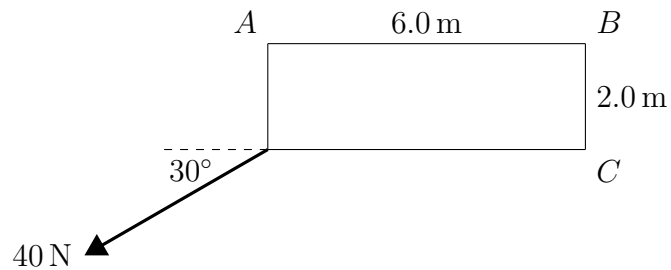
(b)  $B$ ,

(c)  $C$ ,

in the following diagram. The distances are given along the line below.

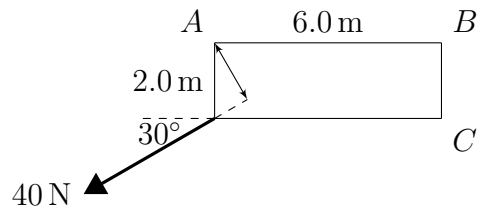


4. The following diagram shows a force of 40 N.



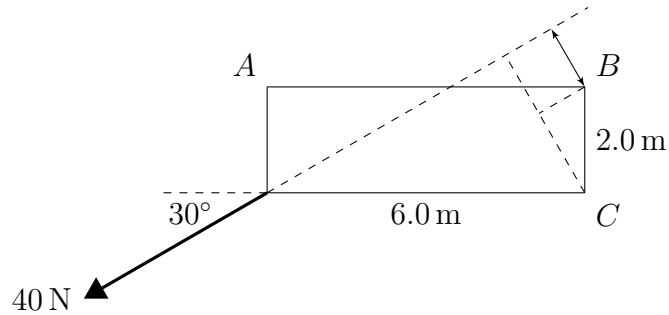
Calculate the moment of this force about

(a)  $A$ ,



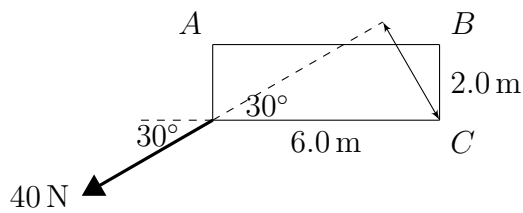
$$\begin{aligned}
 M &= F \times d \\
 &= 40 \text{ N} \times 2.0 \text{ m} \times \cos(30^\circ) \\
 &= 69 \text{ N m } \odot .
 \end{aligned}$$

(b)  $B$ ,



$$\begin{aligned}
 M &= F \times d \\
 &= 40 \text{ N} \times (6.0 \text{ m} \times \sin(30^\circ) - 2.0 \text{ m} \times \cos(30^\circ)) \\
 &= 51 \text{ N m } \odot .
 \end{aligned}$$

(c)  $C$ .



$$\begin{aligned}
 M &= F \times d \\
 &= 40 \text{ N} \times 6.0 \text{ m} \times \sin(30^\circ) \\
 &= 120 \text{ N m } \odot .
 \end{aligned}$$



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