4   A rigid plank is used to make a ramp between two different horizontal levels of ground, as shown in Fig. 4.1.
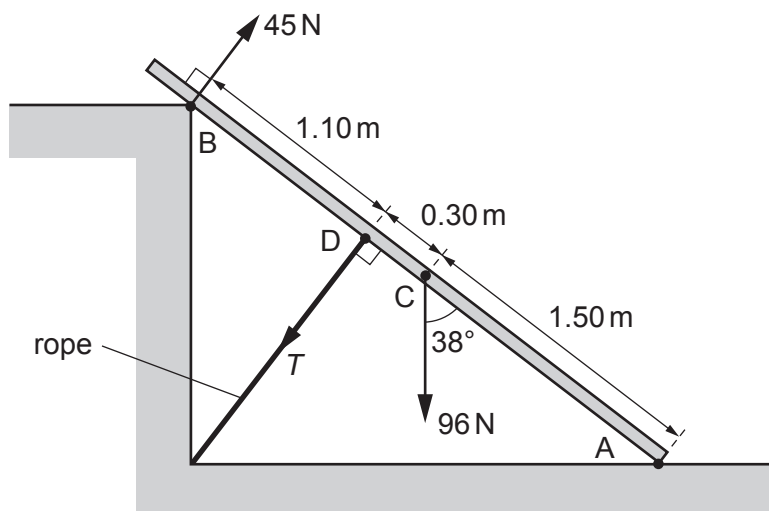

Fig. 4.1 (not to scale)

Point A at one end of the plank rests on the lower level of the ground. A force acts on, and is perpendicular to, the plank at point B. The plank is held in equilibrium by a rope that connects point D on the plank to the ground. The plank has a weight that may be considered to act from its centre of gravity C.

The rope is perpendicular to the plank and has tension T. The plank is at an angle of 38° to the vertical.

The forces and the distances along the plank of points A, B, C and D are shown in Fig. 4.1.

(a)   Show that the component of the weight that is perpendicular to the plank is 59 N.

[1]

(b)   By taking moments about end A of the plank, calculate the tension T.

$T =$ .... N [3]