

Solutionbank M1

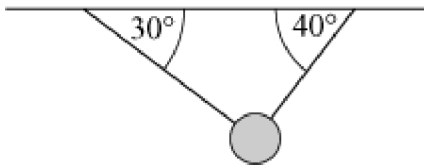
Heinemann Modular Maths for Edexcel AS and A-level

4 Forces

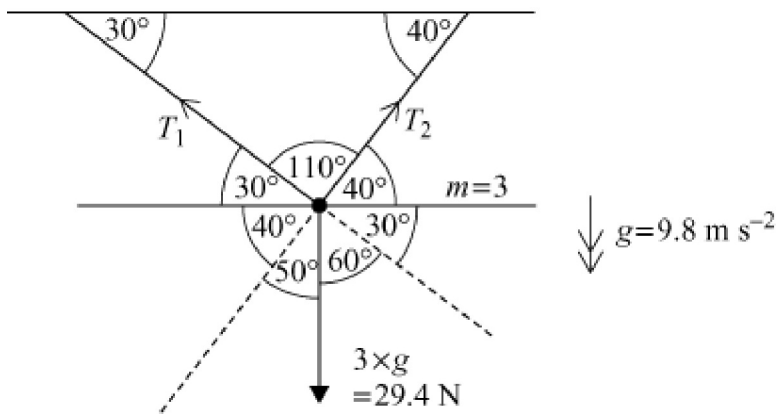
Exercise E, Question 18

Question:

An object of mass 3 kg is suspended by two light, inextensible strings. The strings make angles of 30° and 40° to the horizontal, as shown in the diagram. Find the magnitude of the tension in each string.



Solution:



Resolving perpendicular to T_1

$$T_2 \sin 70^\circ = 29.4 \times \sin 60^\circ$$

$$\therefore T_2 = \frac{29.4 \times \sin 60^\circ}{\sin 70^\circ} = 27.095\dots$$

$$T_2 = 27.1 \text{ N (3 s.f.)}$$

Resolving horizontally

$$T_1 \cos 30^\circ = T_2 \cos 40^\circ$$

$$\therefore T_1 = \frac{27.095 \times \cos 40^\circ}{\cos 30^\circ} = 23.967\dots$$

$$T_1 = 24.0 \text{ N (3 s.f.)}$$