4 A uniform rod AB has length $2a$ and weight W. The end A rests on rough horizontal ground and the end B rests against a smooth vertical wall. The angle between the rod and the horizontal is θ, where $\tan\theta = \frac{4}{3}$. One end of a light inextensible rope is attached to a point C on the rod. The other end is attached to a point where the vertical wall and the horizontal ground meet. The rope is taut and perpendicular to the rod. The rope and rod are in a vertical plane perpendicular to the wall.

(i) Show that $AC = \frac{18}{25}a$. [2]

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The magnitude of the frictional force at A is equal to one quarter of the magnitude of the normal reaction force at A.

(ii) Show that the tension in the rope is $\frac{1}{4}W$. [6]

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(iii) Find expressions, in terms of W, for the magnitudes of the normal reaction forces at A and B. [2]

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