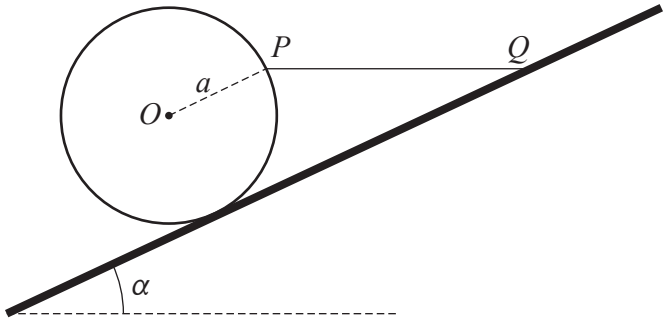
4



A ring of weight W, with radius a and centre O, is at rest on a rough surface that is inclined to the horizontal at an angle α where $\tan\alpha = \frac{1}{2}$. The plane of the ring is perpendicular to the inclined surface and parallel to a line of greatest slope of the surface. The point P on the circumference of the ring is such that OP is parallel to the surface.

A light inextensible string is attached to P and to the point Q, which is on the surface, such that PQ is horizontal (see diagram). The points O, P and Q are in the same vertical plane. The system is in limiting equilibrium and the coefficient of friction between the ring and the surface is μ.

(a) Find, in terms of W, the tension in the string PQ. [4]

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(b) Find the value of μ. [3]