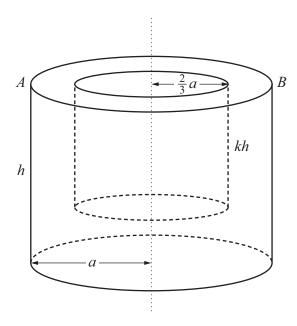
[4]

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An object is formed by removing a cylinder of radius  $\frac{2}{3}a$  and height kh (k < 1) from a uniform solid cylinder of radius a and height h. The vertical axes of symmetry of the two cylinders coincide. The upper faces of the two cylinders are in the same plane as each other. The points A and B are the opposite ends of a diameter of the upper face of the object (see diagram).

(a) Find, in terms of h and k, the distance of the centre of mass of the object from AB.

**(b)** 

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When the object is suspended from A, the angle between AB and the vertical is  $\theta$ , where  $\tan \theta = \frac{3}{2}$ .

7

Given that $h = \frac{8}{3}a$ , find the possible values of $k$ .	[3]
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	••••••

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