Moments

Gold

A uniform rod AB, of weight W and length $5l$, rests horizontally on two supports, one at A and one at C, where $AC = 4l$. A particle of weight $3W$ is placed on the rod at a distance d from A. The rod remains horizontal and in equilibrium.

a Find the greatest possible value of d.

The magnitude of the reaction of the support at A is R. Due to a weakness in the support at A, the greatest possible value of R is $3W$,

b find the least possible value of d.

Silver

A diving board AB consists of a wooden plank of length 6 m and mass 40 kg. The plank is held at rest in a horizontal position by two supports at the points A and C, where $AC = 0.8$ m. The force on the plank at A acts vertically downwards and the force on the plank at C acts vertically upwards.

A diver of mass 60 kg is standing on the board at the end B. The diver is modelled as a particle and the plank is modelled as a uniform rod. The plank is in equilibrium.

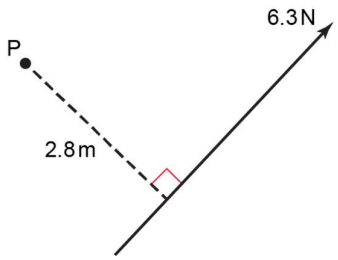
a Draw a diagram representing the forces,
b find the magnitude of the force acting on the plank at A.

Bronze

Calculate the moment about P of each of these forces acting on a lamina.

Give your answers to 3 significant figures.

a



b