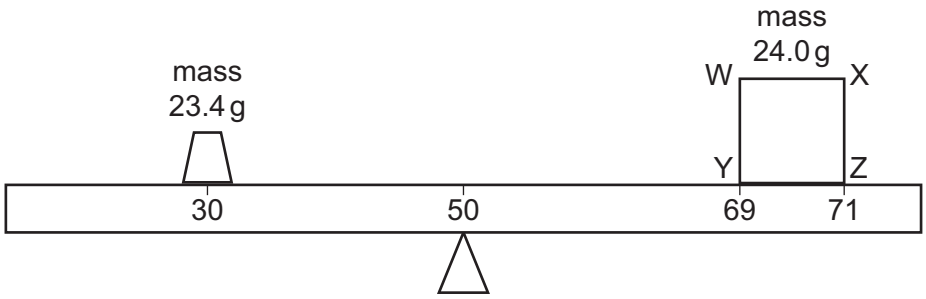
12 A cube WXZY has sides of length 2.0 cm and mass 24.0 g. The cube rests on a metre rule of negligible mass. The geometrical centre of the cube is vertically above the 70.0 cm mark on the scale of the rule.



The cube has a non-uniform density so that its centre of gravity is **not** at its geometrical centre. The centre of gravity of the cube is in the plane of the diagram.

The rule rests on a pivot at the 50.0 cm mark. A mass of 23.4 g is placed vertically above the 30.0 cm mark. The rule is horizontal and in equilibrium.

What can be determined about the position of the centre of gravity of the cube?

A It must be somewhere along a horizontal line that is 0.5 cm from line WX.

B It must be somewhere along a horizontal line that is 0.5 cm from line YZ.

C It must be somewhere along a vertical line that is 0.5 cm from line WY.

D It must be somewhere along a vertical line that is 0.5 cm from line XZ.

13 A rigid sphere is held at rest on the sea bed. When the sphere is released, it rises to the surface of the sea. The seawater has a uniform density.

Which statement about the sphere, from its release until it reaches the surface, is correct?

A The sphere always moves with constant acceleration.

B The sphere always moves with constant velocity.

C The upthrust on the sphere always decreases.

D The upthrust on the sphere is always constant.

14 What is a unit for density?

A $N\,m^{-3}$ **B** $g\,mm^{-1}$ **C** $kg\,cm^{-2}$ **D** $\mu g\,mm^{-3}$