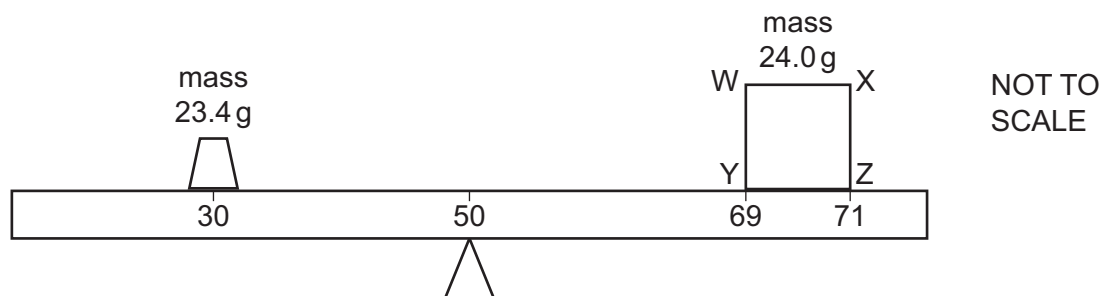


- 12 A cube WXZY has sides of length 2.0 cm and mass 24.0 g. The cube rests on a metre rule of negligible mass. The geometrical centre of the cube is vertically above the 70.0 cm mark on the scale of the rule.



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  $\text{Nm}^{-3}$
  - B  $\text{g mm}^{-1}$
  - C  $\text{kg cm}^{-2}$
  - D  $\mu\text{g mm}^{-3}$