

**Question 20** (3 marks)

A student is investigating inertial and non-inertial frames of reference. The student carries out a series of activities on a boat floating on a large, calm lake. The boat remained level during these activities.

3

Each activity and the student's observed results are recorded in the table.

<i>Activity</i>	<i>Observation</i>
Dropped a ball from a set height	Ball fell vertically with increasing velocity
Rolled a ball from one side of the boat to the other	Ball rolled across the floor with a constant velocity
Rolled a ball from the back of the boat towards the front of the boat	Ball rolled across the floor with a constant velocity

Justify the student's conclusion that: 'The boat can be regarded as an inertial frame of reference'.

The boat can be regarded as an inertial frame of reference because the motion of the ball maintained a constant velocity when rolled across the boat ~~and~~ as seen by the observer and that the ball fell vertically from its dropped position. In non-inertial reference frames there would be change in acceleration not velocity.