3. [*In this question, the unit vectors* **i** *and* **j** *are in a vertical plane,* **i** *being horizontal and* **j** *being vertically upwards.*]

The point A is on horizontal ground.

A ball is projected from A with velocity $(8\mathbf{i} + 14\mathbf{j})\,\text{m s}^{-1}$

The motion of the ball is modelled as that of a particle moving freely under gravity.

(a) Find the maximum possible height of the ball above the ground.

(2)

(b) Find the speed of the ball 2.4 s after leaving A.

(3)

The point B is also on the horizontal ground.

The point C is 3 m vertically above B.

After the ball reaches its maximum height, the ball passes through the point C.

(c) Find the distance AB.

(5)

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Question 3 continued

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Question 3 continued

(Total for Question 3 is 10 marks)