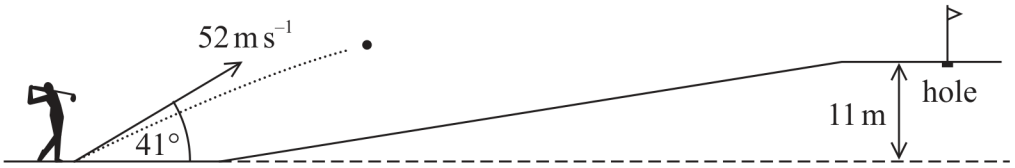
18 A golfer hit a golf ball into the air at a speed of $52\,m\,s^{-1}$ and an angle of 41° to the horizontal, as shown.



The ball landed on the ground near a hole. The ground was 11 m higher than the starting point of the ball.

(a) Show that the vertical component of the ball's initial velocity was about $30\,m\,s^{-1}$.

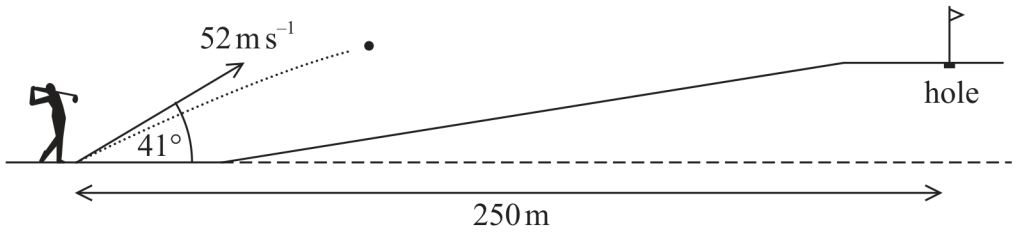
(2)

(b) Show that the time taken by the ball to reach the ground was about 7 s. You should ignore the effects of air resistance.

(3)

DO NOT WRITE IN THIS AREA

(c) The hole is a horizontal distance of 250 m from the starting point of the ball, as shown.



Deduce whether the ball landed within 5.0 m of the hole. You should ignore the effects of air resistance.

(3)

(Total for Question 18 = 8 marks)