

7

(a)

[5]

①

At point A , the particle strikes a fixed smooth barrier, rebounds, and lands on the horizontal plane. The barrier is inclined at an angle of 45° to the horizontal.

(b) Find the speed of P immediately before it collides with the barrier. [3]

(c) Given that the coefficient of restitution between the barrier and the particle is $\frac{1}{9}$, find the horizontal distance travelled by P after it strikes the barrier. [4]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

[illegible]

4

(a)

[4]

[illegible]

Further Mathematics: **9231 Mathematics - Further November 2025 Question Paper** 34

- 2

- (a)** Use the equation of the trajectory given in the list of formulae (MF 19) to show that

$$y = 2x - \frac{25x^2}{u^2}.$$

[1]

- (b)** In the subsequent motion, P passes through the point with coordinates $(8,12)$. The particle then hits a fixed vertical barrier 7 m high that is at a horizontal distance of D m from the point of projection.

Find the set of possible values of D .

[5]

Name:

- 2

(a)

[4]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

(b) Given that P clears the wall, find the minimum distance from point O where P can land. [2]

8

7

(a)

[1]

At time T , particle P is moving at an angle of 60° below the horizontal.

(b)

[3]

[illegible]

Del Further Mathematics: **9231 Mathematics - Further June 2025 Question Paper** 33

At time T , the particle strikes a smooth horizontal plane at a point which is a horizontal distance D from O and a vertical distance H below O .

(c) Find the ratio $H : D$.

[4]

[illegible]

After striking the horizontal plane, P rebounds with speed w . The coefficient of restitution between P and the plane is $\frac{2}{3}$.

(d) Find w in terms of U .

[3]

[illegible]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

[illegible]