Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Thursday 18 June 2026

Time: 2 Hours

Paper reference **MWD/03**

Mathematics

Advanced

PREDICTED PAPER 3: Statistics and Mechanics

You must have:
Mathematical Formulae and Statistical Tables (Green), calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided – there may be more space than you need.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

FOR MORE MATHSWITHDAN RESOURCES, SCAN THE QR CODES:

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Hello there! I hope your revision is going splendidly.

Welcome to my Predicted Paper 3 for Edexcel A Level Maths June 2026!

My name is Daniel, I am a full time GCSE and A Level Maths tutor with a First-Class degree In BSc Mathematics.

In addition to my tutoring sessions, I run a YouTube channel where I offer detailed walkthroughs of past GCSE and A-Level Maths papers. I am also on TikTok and Instagram, where I go through quick-fire questions to help students stay sharp, whether they're scrolling late at night or on their way to school!

This paper includes a variety of questions gathered from past exam papers (all publicly available) and questions created by me! I've uploaded a full video walkthrough for this paper on my YouTube channel – it's a great way to check your answers and understand the methods. You can access it by scanning the QR code below or in the top right corner of each page! Do the paper FIRST before watching the video!

DISCLAIMER:

There is no guarantee the topics in this paper will come up. Use this paper as extra practice alongside comprehensive revision. Good luck!!!

SCAN THE QR CODE FOR THE ENTIRE WALKTHROUGH

Scan here:

SECTION A: STATISTICS

Answer ALL questions. Write your answers in the spaces provided.

1. A group of 200 adults were asked whether they subscribe to Netflix, Disney+ or Prime Video
Their replies showed that

- 27 subscribe only to Netflix
- 34 subscribe only to Disney+
- 39 subscribe only to Prime Video
- 18 subscribe to Netflix and Prime Video but **not** Disney+
- 12 subscribe to Disney+ and Prime Video but **not** Netflix
- 25 subscribe to Netflix and Disney+ but **not** Prime Video
- 30 **do not** subscribe to Netflix, Disney+ or Prime Video.

(a) Using this information, complete the Venn diagram on the next page. **(3)**

One of these adults was chosen at random.

(b) Find the probability that this adult,

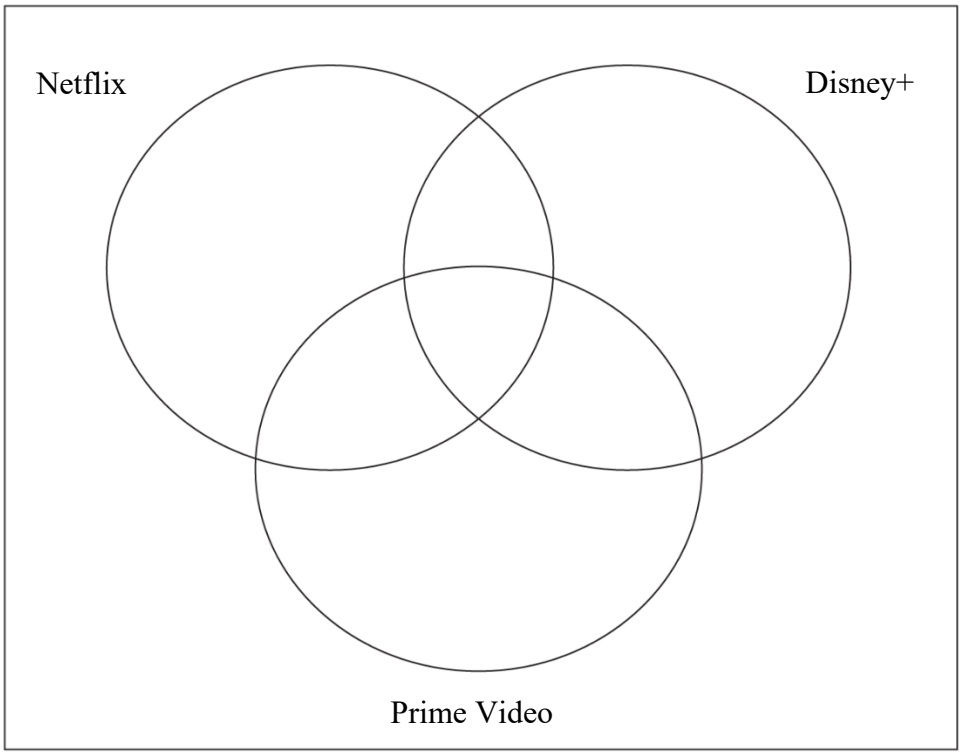
(i) subscribes to Netflix, Disney+ and Prime Video, **(1)**

(ii) does not subscribe to Netflix. **(2)**

Given that this adult subscribes to Disney+,

(c) find the probability that this adult also subscribes to Prime Video. **(2)**

Question 1 continued



Question 1 continued

Question 1 continued

(Total for Question 1 is 8 marks)

2. Amara takes 12 free throws in basketball.

The random variable X represents the number of successful free throws.

The probability that Amara scores a free throw is 0.25.

(a) Using a suitable distribution for X, find

(i) $P(X = 4)$

(ii) $P(X < 4)$

(3)

Amara repeats this experiment each day for 70 days and records the number of days when $X = 4$

(b) Find the probability that there were at least 14 days when $X = 4$ **(3)**

(c) Find an estimate for the total number of successful free throws Amara will score during these 70 days. **(1)**

(d) Use a normal approximation to estimate the probability that Amara scores a total of more than 220 successful free throws during these 70 days. **(4)**

Question 2 continued

Question 2 continued

(Total for Question 2 is 11 marks)

3. As part of an investigation, Bobby collects a sample of 47 observations, x

The results are shown in the following stem and leaf diagram, where a is a constant.

Stem	Leaf	
2	1 2 5 7 7	(5)
3	0 2 2 3 4 5 5 5 9 9	(10)
4	0 0 1 4 4 5 7 8 8 9 9	(11)
5	3 3 5 6 7 9	(6)
6	0 2 a a a 7 8	(7)
7	1 2 3 6 8	(5)
8	0 6 7	(3)

Key: 3 | 2 means 0.32

(a) Find the range of these observations. **(1)**

(b) Find the value of the median of these observations. **(1)**

Given that the interquartile range of these observations is 0.31

(c) find the value of a **(3)**

Bobby calculates the following statistics from these observations

$$\sum x = 23.72 \qquad \sum x^2 = 13.4228$$

(d) Show that the standard deviation of these observations is 0.176 to 3 significant figures. **(2)**

Bobby now collects 18 more observations, y, from the same investigation.

(e) Using all 65 observations, the sample mean is 0.502 and the sample standard deviation is 0.204

(i) Show that $\sum y = 8.91$ **(2)**

(ii) Showing your working, calculate $\sum y^2$ **(3)**

Question 3 continued

Question 3 continued

Question 3 continued

(Total for Question 3 is 12 marks)

4. A company claims that 70% of customers who sign up for a free trial continue to a paid subscription.

A new marketing campaign is introduced.

At the end of the campaign, a random sample of 25 customers who signed up for a free trial was selected and it was found that 21 of them continued to a paid subscription.

Investigate whether there is evidence that the proportion of customers who continue to a paid subscription has increased.

You should

- state your hypotheses clearly
- use a 5% level of significance

(4)

Question 4 continued

(Total for Question 4 is 4 marks)

5. The lifetimes of a brand of light bulb are normally distributed with

- A mean of 1200 hours
- A standard deviation of 150 hours

(a) Find the probability that a randomly selected light bulb lasts between 1000 and 1300 hours.

(1)

Given that 10% of light bulbs last longer than k hours,

(b) find the value of k to the nearest hour.

(2)

A different manufacturer claims that their light bulbs have a mean lifetime of less than 1200 hours.

A random sample of 64 light bulbs from this manufacturer is taken and the mean lifetime is found to be 1165 hours.

(c) Carry out a suitable test to assess the manufacturer's claim.
You should

- state your hypotheses clearly
- use a 5% level of significance

(4)

Question 5 continued

Question 5 continued

Question 5 continued

(Total for Question 5 is 7 marks)

6. For a certain value of the constant p, the random variable X has the probability distribution given in the table.

x	1	2	3	4
$\mathrm{P}(X = x)$	p	$\frac{1}{6}p$	p^2	$\frac{1}{2}$

Two independent values, X_1 and X_2 , of X are found.

Determine $P(X_1 + X_2 = 6 \mid X_2 > X_1)$

(8)

Question 6 continued

Question 6 continued

(Total for Question 6 is 8 marks)

TOTAL FOR SECTION A IS 50 MARKS

SECTION B: MECHANICS

Unless otherwise stated, whenever a numerical value of g is required, take $g = 9.8$ m s^{-2} and give your answer to either 2 significant figures or 3 significant figures.

Answer ALL questions. Write your answers in the spaces provided.

7. A motorbike is moving with constant acceleration along a straight horizontal road.

The motorbike passes a point P and 10 seconds later passes a point Q.

The speed of the motorbike as it passes Q is 28 m s^{-1}

Given that $PQ = 220$ m,

(a) find the acceleration of the motorbike,

(3)

(b) find the distance travelled by the motorbike during the fifth second after passing P

(4)

Question 7 continued

Question 7 continued

Question 7 continued

(Total for Question 7 is 7 marks)

8. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

At time $t = 0$, a particle P is at the fixed point O

At time t seconds, $t > 0$, P has position vector $\mathbf{r}$ metres relative to O, where

$$\mathbf{r} = \left(3t + 2 - 2\sqrt{t+1}\right)\mathbf{i} + (t^2 - 6t)\mathbf{j}$$

(a) Find the speed of P at the instant when P is moving in the direction of the vector $\mathbf{i}$

(5)

(b) Find the magnitude of the acceleration of P when $t = 0.25$

(4)

(c) Show that P never returns to O

(2)

Question 8 continued

(Total for Question 8 is 11 marks)

9.

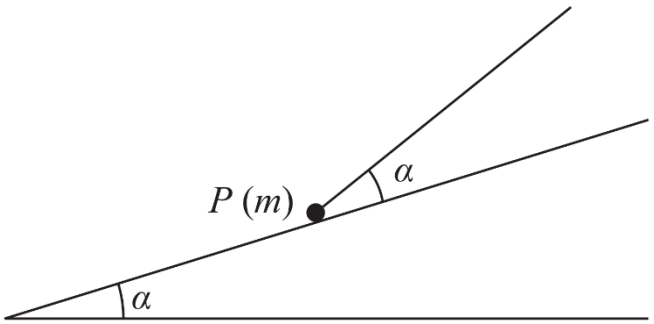


Figure 1

A particle P of mass m is held in equilibrium on a fixed rough inclined plane by a light inextensible string.

The plane is inclined at an angle α to the horizontal, where $\alpha < 45°$
The string is inclined to the plane at angle α, as shown in Figure 1.

The string lies in a vertical plane that contains a line of greatest slope of the inclined plane.

When the tension in the string is $0.75\,mg$, P is on the point of moving up the plane.

(a) Find an expression for the magnitude of the frictional force acting on P, giving your answer in terms of m, g and α

(3)

The coefficient of friction between P and the plane is $\frac{1}{2}$

(b) Show that

$$\tan\alpha = \frac{2}{5}$$

(6)

The string breaks.

(c) Determine whether P remains at rest. You must justify your reasoning.

(3)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 12 marks)

10. [*In this question* **i** *and* **j** *are unit vectors, with* **i** *horizontal and* **j** *vertically upwards*.]

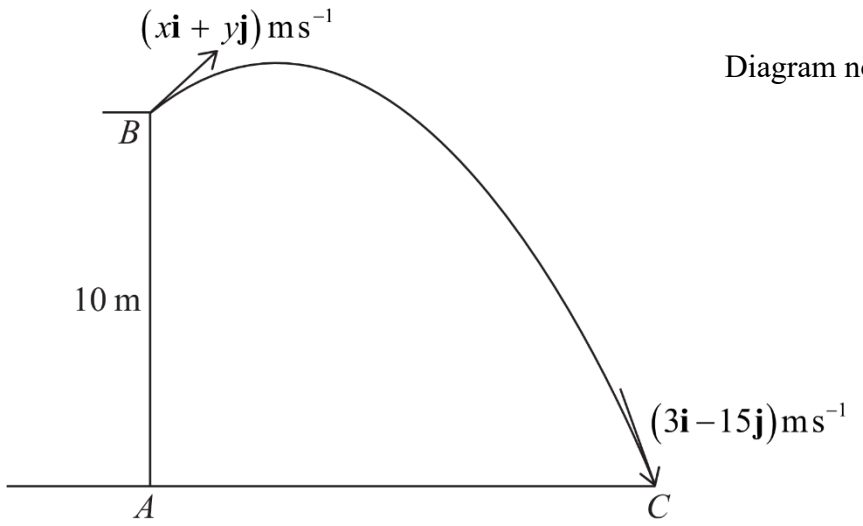


Figure 2

The fixed points A and C lie on horizontal ground.

The point B is vertically above A, with AB =10m

At time $t = 0$, a particle P is projected from B with velocity $(x\mathbf{i} + y\mathbf{j})\mathrm{ms^{-1}}$, where x and y are positive.

Particle P moves freely under gravity and hits the ground at C.

At the instant before P hits the ground, the velocity of P is $(3\mathbf{i} - 15\mathbf{j})\mathrm{ms^{-1}}$, as shown in Figure 2.

(a) Find the value of x and the value of y.

(4)

(b) Find the greatest height above the ground reached by P.

(2)

(c) Find the distance AC.

(4)

Question 10 continued

Question 10 continued

(Total for Question 10 is 10 marks)

11.

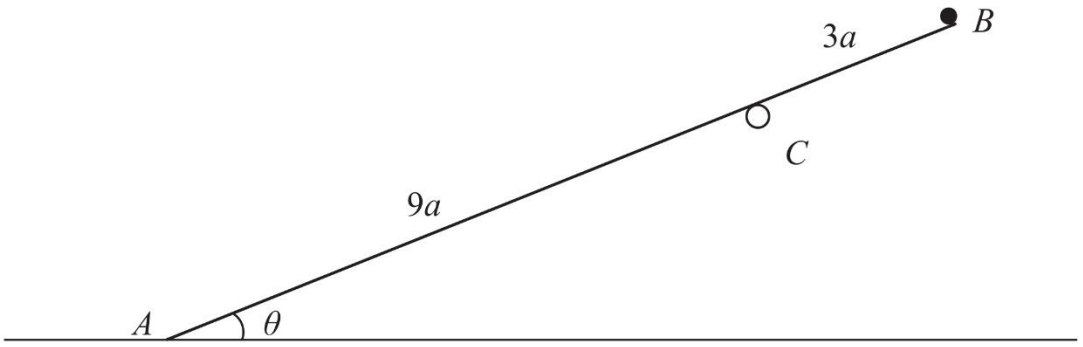


Figure 3

A uniform beam AB, of weight $5W$ and length $12a$, rests with end A on rough horizontal ground.
A package of weight W is attached to the beam at B.
The beam rests in equilibrium on a smooth horizontal peg at C, with $AC = 9a$, as shown in Figure 3.

The beam is inclined at an angle θ to the ground, where $\tan\theta = \frac{5}{12}$

The beam is modelled as a rod that lies in a vertical plane perpendicular to the peg.
The package is modelled as a particle.

The normal reaction between the beam and the peg at C has magnitude kW

Using the model,

(a) show that $k = \frac{56}{13}$ **(4)**

The coefficient of friction between A and the ground is μ

Given that the beam is resting in limiting equilibrium,

(b) find the value of μ **(6)**

Question 11 continued

Question 11 continued

Question 11 continued

(Total for Question 11 is 10 marks)

TOTAL FOR SECTION B IS 50 MARKS

TOTAL FOR PAPER IS 100 MARKS

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Congratulations on completing the paper! I hope it has helped you with your revision.

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Take care!