

GCE Examiners' Report

Mathematics

GCE

Summer 2025

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Introduction

Our Principal Examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.¹

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

¹ Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
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Executive Summary

The examination papers in GCE Mathematics were generally of a similar standard to previous examination series. As is always the case, some questions were more demanding in some topics than in previous series, whilst others were less demanding. It was pleasing to see that, unlike in the previous few series, this year, candidates embarking on the AS / A2 Mathematics course seemed to have fewer gaps in their knowledge and understanding and, therefore, were able to access more demanding topics and skills.

There are some areas of the subject content that are not well understood each year and this year was no exception. These include topics such as vectors, proofs, projectiles and hypothesis tests. Other topics that are specific to units are listed in the individual unit reports. Similarly, there are certain skills that are lacking each year which can prove costly, e.g. algebraic manipulation and graph sketching.

Similar to previous series, questions that were set in a non-standard format, i.e. in context, both mathematical and non-mathematical, proved challenging for candidates. They struggled to translate the information given in the question into the relevant mathematical processes. These problem-solving styles of questions require a deeper understanding of the underlying mathematics, than simply following routine processes and procedures.

Overall, candidates performed better on the exam papers this series, and many excellent solutions were seen to all questions in all four GCE Mathematics units, e.g. solving trigonometric equations (Units 1 and 3), Poisson distribution (Unit 2), and moments (Unit 4).

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AS UNIT 1 PURE MATHEMATICS A

Overview of the Unit

This paper appears to have been well received by candidates. There were many excellent solutions seen for all 16 questions. Although questions 8(b)(ii), 15(b) and 16(b) proved challenging for a number of candidates, many excellent full-mark solutions were seen.

The general feedback from practitioners was that this paper was relatively accessible, with a few differentiating questions to challenge the most able candidates. This was supported by the overall better performance seen by candidates on this year's paper, compared to the summer 2024 paper.

Questions on the following topics were well answered:

- Coordinate geometry (Q2)
- Rationalising surds (Q3b)
- Finding coordinates of stationary points and determining their nature (Q6b)
- Solving trigonometric equations (Q10)

Some candidates had difficulty with the following content:

- Tangents to a circle (Q8bii)
- Good presentation of proofs (Q9)
- Vectors in a mathematical context (Q14)

Areas for improvement:

- Algebraic manipulation
- Curve sketching
- Drawing diagrams, where none are given, to help visualise the problem, e.g. Q2c, Q8bii, Q14

Comments on individual questions/sections

Q.2 In part (c), a clearly drawn diagram would have proved beneficial. Without this, many candidates failed to realise that the triangle was right-angled at B , or that the triangle sat on the x -axis, which would have made calculating the area relatively straightforward.

Q.6 It was disappointing that many candidates were not able to sketch a positive cubic curve. There were many unusual sketches seen.

- Q.7** This was a standard question on the sine or cosine rule. In this instance, candidates who used the cosine rule were more likely to get both required answers, as solving the resulting quadratic equation yielded two solutions. However, candidates who used the sine rule often failed to realise that there was an obtuse solution as well as an acute one.
- Q.8** It was rare to see fully correct solutions to 8(b)(ii). Candidates who drew an accurate sketch were more likely to spot that one of the tangents had a gradient equal to zero. Many candidates simply found the gradient of the chord joining the points of intersection found in 8(b)(i).
- Q.9** In this question, candidates often gave an incorrect definition of the derivative, resulting in the loss of the 2 marks allocated to this. It was a disappointing performance by candidates, particularly since the definition and the subsequent steps required are standard practice for all questions assessing differentiation from first principles.
- Q.12** In part (b), most candidates failed to realise that the transformed curve intersected the y -axis at the same point as the original curve.
- Q.13** In this question, the error $\frac{\sin^2 x}{\cos^2 x} = \tan x$ was seen numerous times.
- Q.14** To answer this question effectively, a good diagram was essential, but sadly, this was not often seen.
- Q.15** In part (b), candidates failed to realise that $4^x = (2^x)^2$, so that the substitution $y = 2^x$ would result in a quadratic equation.

Q1, Q3, Q4, Q5, Q10, Q11, Q16 – These questions performed as expected and there were no areas to highlight.

MATHEMATICS

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AS UNIT 2 APPLIED MATHEMATICS A – SECTION A

Overview of the Unit

The standard of responses in Section A Statistics was slightly poorer this year compared to last year. The paper differentiated well between the most and least able candidates. Many candidates found work at this level overly challenging, particularly the question assessing hypothesis testing (Q3). Some of the questions which simply involved routine calculations were reasonably well answered, but candidates struggled with the questions that required explanations in context.

Questions on the following topics were answered well:

- Calculating the mean and standard deviation from summary statistics (Q5f)
- Calculating probabilities using the Poisson distribution (Q1a)

Some candidates had difficulty with the following content:

- Understanding large data sets and how to interpret correlation (Q5)
- Hypothesis tests for the proportion in a binomial distribution (Q3ab)
- Calculating and interpreting Type II errors (Q3c)

Areas for improvement:

- Giving explanations, or interpreting results, in context

Comments on individual questions/sections

Q.1 Part (a) was answered well by the majority of candidates. Recognising that a Poisson distribution was appropriate and calculating the appropriate probability was done well. Some candidates failed to state the distribution and therefore lost a mark. Teachers and candidates are reminded of the importance of good mathematical notation and that stating the distribution used is considered good practice. A far greater number of candidates found part (b) difficult – recognising the new Poisson distribution proved more challenging than in part (a).

Q.2 This question was similar to one that appeared in the 2023 paper. Although questions of this style were regularly assessed in the legacy qualification, candidates appeared to be unfamiliar with the skills required to answer this question successfully. Very often, candidates did not realise that they had to multiply the probabilities. Another common error was to include (3,3) twice, or to include (2,4), but not (4,2). Writing a simple possibility space (GCSE Intermediate tier), would have made this question more accessible for some candidates.

Q.3 This was the most poorly answered question on the paper. It was a challenging question assessing hypothesis testing. Candidates struggled to correctly interpret the context set out in the stem of the question and, consequently, stated incorrect alternative hypotheses: $p > \frac{1}{3}$ instead of $p < \frac{1}{3}$, where p was the probability of answering Martin's new question correctly. Disappointingly, many candidates chose to use 0.33, or even 0.3, instead of $\frac{1}{3}$.

Candidates continue to calculate $P(X = x)$, instead of $P(X \leq x)$, when conducting a hypothesis test, demonstrating a lack of understanding of the processes involved. In addition to calculating the p -value, some candidates also calculated a critical region, which was an unnecessary additional calculation.

Candidates did not perform well in part (c). Many candidates used the distribution $B(63, 0.2)$ to calculate both the critical regions and the required probabilities. Over a quarter of candidates did not attempt part (c).

Q.4 Candidates are encouraged to become familiar with Venn diagrams in a multitude of different settings. Many candidates were able to answer part (a) correctly. Those that were unable to, often thought that $P(A) = 0.17$, failing to realise that B was a subset of A . Many candidates simply multiplied 0.13 and 0.17 in an attempt to calculate $P(A \cap B)$.

There was a myriad of ways that candidates could approach part (b). The one that caused the most concern was interpreting p as $P(C)$ and q as $P(D)$. Follow through marks were available, and candidates benefitted from these when finding r .

Q.5 Part (a) was comparatively well done, although some responses were either too generic or showed a lack understanding of large data sets.

Part (b) involved a routine interpretation of scatter diagrams, but was not answered as well as expected.

In part (c), the vast majority of candidates were unable to provide a valid comment that demonstrated that they had considered the context of the question and the data provided.

In part (d), many candidates were able to carry out the correct calculation, but then were unable to provide a correct comment on the reliability of their answer. Some candidates did not use the equation of the regression line provided to calculate their estimate of life expectancy, as was required, but instead read the value directly off the graph.

The majority of candidates were able to carry out the correct calculations in part (f)(i). However, only a minority of candidates appreciated that life expectancy is an average measure, and that calculating the mean of means does not necessarily lead to an accurate figure for global life expectancy, and, therefore, the life expectancies should be weighted by population size.

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AS UNIT 2 APPLIED MATHEMATICS A – SECTION B

Overview of the Unit

Section B of the paper appeared to be accessible to most candidates, allowing candidates of all abilities to display their knowledge and demonstrate their mathematical skills. Many exemplar solutions were seen for all five questions.

Attempt rates were consistently high, supporting the fact that sufficient time was available to complete Section B of the paper. However, attempt rates were marginally lower than during the Summer 2024 series. In general, facility factors were consistently strong when compared to previous series, suggesting that candidates who attempted questions generally performed better than in 2024 and previous series.

Questions on the following topics were well answered:

- Understanding, using and interpretation of a velocity-time graph (Q10a & Q10c)
- Derivation of formulae for constant acceleration for motion in a straight line (Q7a)
- Application of Newton's Laws to connected particles in a pulley system (Q8ai)

Some candidates had difficulty with the following topics:

- Using Newton's second law in a vector setting (Q6b)
- Selecting and using the formulae for constant acceleration for motion in a straight line where the acceleration is due to gravity (Q7bi)
- Understanding and using the language of kinematics (Q10b)

Areas for improvement include:

- The use of diagrams. Candidates remain reluctant to draw helpful diagrams. In many cases, they could simply annotate diagrams that are provided in the question (Q8, Q9 & Q10)
- Using calculus in kinematics for motion in a straight line. Many candidates continue to incorrectly assume that when $t = 0, x = 0$ (Q9a)
- The use of exact values from calculators

Comments on individual questions/sections

Q.6 Part (a) was answered successfully overall, with most candidates understanding what is meant by equilibrium in a vector setting. Notation could be improved in many cases. Part (b) was less successful due to confusion between acceleration and acceleration vector. Many candidates found the magnitude of the force $\mathbf{G} + \mathbf{H}$ and hence incorrectly concluded with $a = 2\sqrt{13}$.

- Q.7** Part (b) was the most accessible of the mechanics questions on the paper. However, it was not always answered in the most efficient way.

Some candidates did not recognise the ‘symmetry’ of the underlying scenario and so multiple applications of the ‘suvat’ equations were attempted. Candidates rarely take advantage of the fact that, when a particle returns to its point of projection, its displacement is zero and its speed on return is equal to the speed of projection. Many candidates determined the time taken for the object to reach its highest point, then multiplied by 2 to get the desired result.

- Q.8** Part (a)(ii) was the least accessible part question on the paper. It appeared that many did not consider that only 1 mark was allocated to it, suggesting a brief response was required.

- Q.9** Overall, responses were less successful than expected. In part (b), it was encouraging that most candidates recognised that integration was required to obtain an expression for the displacement/distance, meaning that at least 2 marks were secured. However, many incorrectly assumed that when $t = 0, x = 0$. Consequently, an expression for the displacement of the car from its starting position was achieved, instead of from the point A . Therefore, in part (b), the single mark for determining the length of the track was often sacrificed.

- Q.10** Part (b) caused several issues. In the most successful responses, candidates annotated the diagram provided with the appropriate forces and an assumed direction was made clear.

In general, the majority of candidates appreciated the need to isolate the person in the lift, before applying Newton’s second law. However, some ambiguity appeared regarding the meaning of deceleration. Some candidates appeared to work ‘downwards positive’ to get $a = 1$, suggesting that they recognised that this would lead directly to the deceleration. However, some candidates subsequently wrote ‘therefore deceleration $a = -1$ ’, leading to a contradiction.

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A2 UNIT 3 PURE MATHEMATICS B

Overview of the Unit

This year's Unit 3 paper appears to have been well received by candidates. The demand of the paper compares favourably with last year's paper and there was no evidence to suggest that there was insufficient time for candidates to complete all 16 questions.

Excellent solutions were seen to all parts of the paper, including the most challenging questions, Q14 and Q16, although complete solutions to question 16 were rarely seen. A number of questions were well answered by all but the weakest candidates. As expected, the questions that were not scaffolded (Q11), or which required translation into mathematics (Q16) proved difficult for the majority of candidates.

Questions on the following topics were well answered:

- Differentiation (Q1)
- Solving trigonometric equations (Q2)
- Finding coordinates of stationary points (Q5a)
- Arithmetic progression (Q7)

Some candidates had difficulty with the following content:

- Conditions to determine points of inflection, convexity and concavity (Q5)
- Good presentation of proofs (Q9)
- Two-stage integration by parts (Q14a)
- Translating the requirements of a question set in context into mathematics (Q16)

Areas for improvement:

- Algebraic manipulation and basic arithmetic

Comments on individual questions/sections

Q.3 The small angle substitutions for \sin and \cos are detailed in the specification. Candidates who rewrote $\sin 2\theta$ as $2 \sin \theta \cos \theta$ in the denominator obtained a cubic equation, which required the use of a calculator to be solved. Many candidates did not progress further than this point. Few candidates obtained the last mark awarded for disregarding the root with the larger modulus. However, many candidates also disregarded the root with the larger modulus because it was a negative solution. This was the wrong reason and the last mark was withheld.

- Q.4** Part (a) was generally well done, although many creative y values were seen. Some candidates integrated $\tan^2 x + 1$, possibly because their calculators did not give values for $\sec x$. In part (b), many candidates realised that $\tan^2 x + 2 = \sec^2 x + 1$. However, they failed to complete the integration $\int_0^{\frac{\pi}{3}} 1 dx = \frac{\pi}{3}$ correctly. A number of candidates used the trapezium rule again, for which no credit was given.
- Q.5** In part (a), most candidates were able to find the coordinates of the stationary point; however, few were able to correctly classify it as a point of inflection. Some candidates realised that it was a point of inflection, but they were not able to give a correct and sufficient reason for the classification. In part (b), candidates who knew the condition for convexity ($\frac{d^2y}{dx^2} > 0$) obtained both marks. Unfortunately, many candidates did not know this.
- Q.6** This question was generally well answered, except for 6(b)(ii) – candidates struggled to show how a root obtained using the Newton-Raphson method was correct to a given level of accuracy.
- Q.9** The crux of a proof by contradiction is in the initial assumption, which has to be clear and complete. This element was marked strictly in this question. Candidates seemed to lack the rigour required in their solutions, e.g. “Assume x and y are integers” is an incomplete assumption, which gained no credit, resulting in the last mark also being lost, as this was only awarded for a completely correct proof. A number of candidates attempted to do a general proof by substituting in a range of numbers. Whilst others thought that the proof had something to do with common factors.
- Q.10** In part (a), not many candidates were able to sketch $\sec x$ in the interval $0 < x < \frac{\pi}{2}$. Disappointingly, neither did they calculate some intermediate points to assist in their sketch. A plethora of creative curves were seen. Candidates who had an incorrect sketch in part (a) were unable to access the 2 marks in part (b).
- Q.11** Candidates who realised that the integrand needed to be expressed in partial fractions before being integrated performed well on this question. Unfortunately, many candidates did not spot this.
- Q.12** The most common error in this question was the failure to put brackets round $-2x$, or to simply omit the minus sign in the binomial expansion. Candidates often made careless mistakes in their arithmetic, so, consequently, perfect solutions were relatively rare.
- Q.13** Parts (a) and (b) were generally well done. In part (c), numerous candidates thought that $\frac{1}{0} = 0$.
- Q.14** In part (a), candidates were able to earn the first 2 marks. However, many candidates were unable to apply their knowledge to the second application of integration by parts. As usual, sign errors were extremely common. Candidates would benefit from simplifying combinations of $+$ and $-$ signs as they progress through the question. Part (b) proved difficult for many candidates, as the algebra required to change all the x 's to u 's was often incorrect. Disappointingly, candidates who managed to obtain the correct integrand then failed to integrate correctly, as they did not rewrite the integrand into an integrable form.

- Q.15** This topic is not well understood. In part (b), candidates often earned the 4 marks for the algebra, but lost the mark awarded for choosing the correct root. This required understanding the relationship between the domain of $f(x)$ ($x > 3$) and the range of $f^{-1}(x)$. Also, many candidates simply forgot the \pm when taking the square root.
- Q.16** There were very few completely correct solutions seen. However, many candidates realised that there was a geometric sequence involved, and, consequently, were able to find the common ratio (1.05) and the number of terms (20).

Q1, Q2, Q7, Q8 – These questions performed as expected and there were no areas to highlight.

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GCE

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A2 UNIT 4 APPLIED MATHEMATICS B – SECTION A

Overview of the Unit

Many candidates were able to produce excellent responses on a range of questions although a significant number of candidates found work at this level fairly challenging. The slightly more formulaic elements of the paper, such as the hypothesis testing on the product moment correlation coefficient (PMCC) and on the sample mean of a normal distribution, offered plenty of opportunity for candidates to showcase their knowledge. Questions that involved interpretation or some understanding in a wider context were not answered well.

Questions on the following topics were well answered:

- Hypothesis test for a correlation coefficient (Q3b).
- Basic probability questions (Q2a, Q4a).

Some candidates had difficulty with the following content:

- Understanding large data sets and how correlation for a sample appears on scatter diagrams. Correlation and causation in general (Q3).
- Understanding hypothesis tests for the mean of a normal distribution (Q4c).

Areas for improvement:

- Candidates are encouraged to develop a deeper understanding of the topics in this unit, rather than simply following standard processes and procedures. This will allow them to offer more insightful explanations.
- Be familiar with large data sets and inferences that can be drawn from samples about the population.

Comments on individual questions/sections

- Q.1** This question was not answered as well as expected. Candidates were able to set up the simultaneous equations required to find c and d without much difficulty, but then struggled to solve them. Some candidates tried expanding the brackets $(d - c)^2$, but found the subsequent algebra too challenging. Other candidates started with $\frac{1}{12}(c - d)^2 = 3$, which, although correct, led to $c > d$. Those candidates that realised this and corrected themselves scored all the marks, but candidates who stated $c = 10.5$, $d = 4.5$ lost the final mark. Despite some of these difficulties, there were many good responses to this question and it proved to be one of the more accessible questions on the paper.

- Q.2** Part (a) was extremely well done, with almost all candidates scoring full marks in (i). Part (a)(ii) was also very well done, as candidates were able to recognise that conditional probability was required.

Candidates were less successful on part (b). Many candidates attempted to form an equation or inequality in (i). Most recognised that either $p + \dots$ or $(1 - p) \times \frac{1}{4}$ were needed, but few were able to put both parts together to form the correct equation. Sadly, part (b)(ii) was very poorly answered. Few candidates recognised that the binomial distribution was required. The vast majority of candidates attempted this part by trying to sum the probabilities of $X = 8, X = 9$ and $X = 10$. Unfortunately, candidates did not always include the binomial coefficient and / or the probability of failure. Answers of $0.7^8 \times 0.3^2 + 0.7^9 \times 0.3 + 0.7^{10} = 0.0455$, or $0.7^8 + 0.7^9 + 0.7^{10} = 0.1262$ were very common.

- Q.3** Once again, despite many good responses for this question, there are still candidates who struggle with hypothesis tests for correlation coefficients. In part (a), candidates did not always reference that the decline in bus drivers coincided with an increase in delivery drivers, and, therefore, were unable to earn the relevant mark.

In part (b), some candidates demonstrated a good understanding of this topic and were able to earn all the marks available. However, some candidates made errors in their hypotheses, compared the negative value of the correlation coefficient with a positive critical value, or chose the critical value from the Spearman's Rank statistical table, rather than the PMCC statistical table. Candidates should be encouraged to state their hypotheses clearly at the beginning of any hypothesis test. Encouragingly, most candidates who scored the first four marks in part (b) went on to state a correct conclusion in context, thereby earning the final mark.

Candidates were less successful on part (c). In (i), some candidates stated that correlation does not mean causation without any further comments, which did not earn any marks. Many candidates simply stated that there was negative correlation or that delivery companies were recruiting bus drivers because this was stated in the article. There was little consideration given as to why a change in one variable might lead to a change in the other. In part (c)(ii), the overwhelming majority of candidates stated that, over time, delivery companies are recruiting bus drivers. However, they did not take into consideration that the data was only a snapshot in time and that there was no data available for how things change over time.

Q.4 Some parts of this question were well answered, whilst other parts did not fare so well. Part (a) performed excellently. In part (b), many candidates realised that they needed to calculate $P(X > 29.1)$ and $P(X > 28.8)$, but were then unsure how to continue. Some candidates thought that $P(X > 29.1 \cap X > 28.8)$ meant $P(28.8 < X < 29.1)$. Relative to a similar question in the Summer 2024 paper, more candidates recognised that conditional probability was required in part (b), and were able to score all 6 marks. Candidates should be encouraged to consider when conditional probability is required in a question, even if the word 'given' is not explicitly stated.

As was the case in question 3, the hypothesis test in part (c) produced responses of varying quality. Some responses were well structured and correct. Others lacked cohesion and accuracy. Once again, candidates should be encouraged to write their hypotheses clearly at the beginning of their hypothesis test. Unfortunately, in part (c), interchanging μ and \bar{x} led to the same probability of 0.02405. Consequently, examiners had to be vigilant to ensure that candidates were using the correct distribution and test statistic. The significance level of 3% did not cause any issues for candidates.

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A2 UNIT 4 APPLIED MATHEMATICS B – SECTION B

Overview of the Unit

Section B was well received, and many exemplar solutions were seen for all five questions. The paper appeared to be accessible to most candidates, with the exception of question 9(b), for which only a minority were able to achieve full credit.

Attempt rates were consistently high, supporting the fact that sufficient time was available to complete Section B of the paper. Overall, comparison of attempt rates and facility factors suggests that the paper this year was more accessible than that in Summer 2024 and in previous series.

Questions on the following topics were well answered:

- Using calculus in kinematics for motion in a straight line using 2D vectors (Q9a, 78% facility factor)
- Taking moments and resolving forces vertically (Q6a, 64% facility factor)
- Using the $F \leq \mu R$ model for friction on an inclined plane (Q8a, 61% facility factor)

Some candidates had difficulty with the following topics:

- Projectiles using vectors (Q9b, 27% facility factor)
- Stating a suitable modelling assumption for a real-life static force scenario (Q5b, 44% facility factor)
- Application of moments in a situation where the rod is on the point of turning about a pivot (Q6b, 41% facility factor)

Areas for improvement include:

- The use of diagrams. Candidates remain reluctant to draw helpful diagrams. In many cases, they could simply annotate diagrams that are provided in the question (Q5 & Q6)
- The use of exact values from calculators
- Signposting and explanations in solutions

Comments on individual questions/sections

Q.5 Candidates remain reluctant to use exact values, despite these being readily available from their calculators.

Part (b) was not as successful as anticipated. Many candidates repeated the fact that the lights are modelled as a particle, or stated that the string is inextensible, which is insignificant in this case.

Q.6 This question was well done by most candidates, particularly those who annotated the diagram provided. One of the most frequent mistakes was to incorrectly deduce the orientation of one of the moments. Remarkably, a significant number of candidates are still opting for two applications of moments, which relies on correctly determining distances. Invariably, this approach was much less successful than resolving forces vertically combined with a single application of moments. A small number of candidates multiplied the weights by $g = 9 \cdot 8$, leading to a dimensionally incorrect equation.

Part (b) was much less successful, as many candidates did not recognise that the greatest value of W coincides with the fact that the reaction at the point D is zero.

Q.7 Given that this was a relatively straightforward differential equation, efforts were generally disappointing in this question. Many candidates were able to successfully separate the variables, but frequent sign errors were made when attempting to integrate $(t + 2)^{-2}$.

Sadly, many candidates did not attempt to write down the limiting value of v as requested.

Q.8 Almost all candidates identified that a normal reaction to the plane was required and proceeded with $F = \mu R$ for limiting friction. Disappointingly, a small number of candidates did not include ' g ' in either the component of weight down the slope or in their normal reaction / frictional force. Many candidates proceeded with an application of Newton's second law, but struggled with the fact that there were no forces acting up the slope. As a result, friction was often seen acting up the slope. The most successful candidates sketched a clear diagram with all the necessary forces, and they had clearly indicated the direction of the acceleration / deceleration.

Q.9 Efforts were very disappointing in part (b) of this question. This supports the fact that some candidates are still not confident dealing with projectiles in a vector setting. The fact that the motion of the rocket was defined piecewise ($t \leq 4$ and $t > 4$) possibly made the question slightly more challenging.

In part (b)(ii), many candidates did not include the '+64' and hence incorrectly concluded that the rocket lands in the safe zone.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.

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