

MATHEMATICS

General Certificate of Education (New)

Summer 2018

Advanced Subsidiary/Advanced

APPLIED MATHEMATICS A – AS UNIT 2 SECTION A

General Comments

The new specification gave a wide spread in attainment over the course of the paper. Some calculations were generally well done, such as the calculations for outliers and using the equation of the regression line. Many candidates found themselves out of their depth at this level, with the increase in challenge from GCSE to AS a step too far. Questions requiring interpretation or insight were not well answered.

Comments on individual questions

1. This question clearly stated that candidates must show the calculation required. Despite this, many candidates did not show their working and therefore scored no marks.
2. In part (a), many candidates did not give their answer in context. Of those that answered in context, some did not understand that $M \cap D'$ did not refer to the *number* of students studying mathematics and not drama, or to the *probability* of studying mathematics and not drama.

In part (b), a common error was to ignore the 4 students who studied mathematics and drama, thus arriving at an answer of $\frac{25}{40}$.

Part (c) was tackled with a variety of methods. The most successful candidates were those who set out their solution in a similar manner to questions of this kind in legacy statistics papers.

3. This question was not generally very well answered. Many candidates were unable to interpret the situation as being modelled by the Poisson distribution, with most of those that could, using $Po(0.25)$. Even fewer candidates were able to use their answer for part (a) with a binomial distribution to answer part (b).
4. This question was by far the most poorly answered question on the paper. Almost all candidates formed the correct hypotheses, but very few candidates understood the concept of a test statistic.

Part (b) was relatively well done. The most common errors were to find $P(X = 4)$ and $P(X = 5)$ and to form a critical region based on these probabilities. This was not awarded any marks.

A disappointing proportion of candidates failed to give the answer to part (c) in context. In part (d), most candidates did not use their answer to part (b), which would have been the obvious approach to take. Teachers and students should note that “accept H_0 ” is not a reasonable conclusion to come to, having conducted a hypothesis test. The correct terminology should be “do not reject H_0 ”. With regards to the conclusion reached, the evidence did not suggest that the proportion was 0.2, it suggested that there was not enough evidence to say that Edward had improved.

5. This question was reasonably well answered, with the most common omission being the words “on average” for describing the gradient in part (b)(i). Most candidates realised that the reliability of the estimate found in (b)(ii) was not very high. Some thought that it was reliable due to the strong nature of the linear relationship.
6. Performing the calculations to determine the relative position of the outliers was done well by the vast majority of candidates, but the nuanced answer of “40 is an outlier, but there may be others” was only eluded to by a very small number of candidates. An even smaller number of candidates were able to correctly identify what would happen to the median if the outlier was removed.

Part (d) showed that very few candidates had advanced their analytical skills from GCSE, with a large number of candidates simply stating facts such as “The range is bigger for Dafydd”, or “Basel’s median is higher”. This did not score any marks.

MATHEMATICS

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APPLIED MATHEMATICS A – AS UNIT 2 SECTION B

General Comments

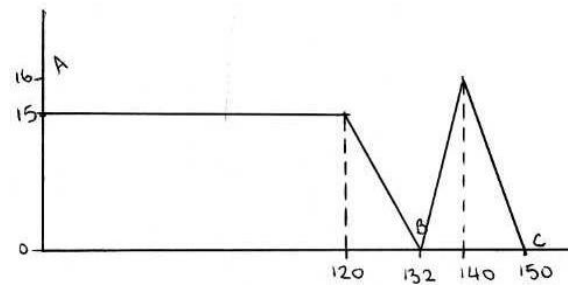
All questions appeared to be accessible to most candidates and it was clear that they were able to finish section B of the paper.

The most challenging questions were notably 8(b) and 11(c).

Comments on individual questions

7. This question provided a gentle start to section B of the paper. Almost all candidates recognised that integration was required in order to obtain an expression for the displacement. Remarkably, many candidates did not go beyond $x = 2t^3 - 4t^2 - 5t + C$ and hence forfeited the final A1 mark. Of those candidates who attempted to find the constant C , many were unsuccessful as they struggled to deal with the initial conditions.
8. This 'standard pulley' question was generally well done. However, possibly due to its simplicity, many candidates incorrectly applied N2L to particle A since there was no force opposing T . In particular, the weight of the particle ($3g$) on the horizontal surface, which acts in a perpendicular direction to the direction of motion, was often erroneously included in the equation of motion, i.e. $T - 3g = 3a$ was considered instead of $T = 3a$. Disappointingly, very few candidates were successful in answering part (b) concerning the effect of a rough pulley. The most frequent incorrect response was "*Tension is constant throughout the string.*"
9. Candidates were very successful in answering this question. Nevertheless, many candidates did not do enough to secure the final mark for the direction of the resultant. Candidates were generally comfortable in dealing with the necessary trigonometry, yet were unconvincing with the direction. Some common ambiguous responses were:
 - $\theta = 77^\circ$ below the axis
 - $\theta = 77^\circ$ below the horizontalA few candidates decided to work out the magnitude and direction of the individual forces **L**, **M** and **N**.
10. This 'standard lift' question was answered very well in general. Since the lift was decelerating, some candidates struggled with the fact that the net upwards force was negative. As a result, these such candidates either dealt with $836g - T = 836a$ or decided to simply drop the negative sign in the answer. A small number of candidates missed out the mass for the person in the lift in part (a). Part (b) was well answered, mainly by those candidates who were comfortable with part (a). Part (c) was also relatively well done as most candidates were able to correctly isolate the forces acting on the person and the floor of the lift.

11. Candidates were very successful in answering parts (a) and (b). For the sketch in part (c), few candidates were able to gain full marks since they mainly struggled with the concept of negative velocity. Furthermore, axes were not labelled sufficiently in many cases. A frequent response is shown below.



In part (d), due to the confusion over negative velocity, $AC = 1890 + 144$ was frequently seen.