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General Certificate of Education

Mathematics 6360
Statistics 6380

MS/SS1A Statistics 1A

Report on the Examination

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Registered address: AQA, Devas Street, Manchester M15 6EX
Dr Michael Cresswell Director General.

Written Component

General

A significant proportion of candidates appeared inadequately prepared for this paper. Whilst the majority were aware of the techniques required for each question, they were often unable to carry out the necessary work accurately. As a result, the overall standard of performance was somewhat disappointing.

Typical Grade A/B candidates provided correct and accurate solutions to almost all of the numerical and algebraic parts of questions but dropped marks where comments or interpretations were required. Grade E candidates either scored part marks across the paper or reversed a very mediocre performance by scoring quite well on a couple of questions, usually questions 4 and 6.

As was intended, the majority of candidates used the statistical functions on their calculators correctly in answering questions 1 and 6. However the 3 missing values in question 1(b) caused some candidates a 'calculator' problem, whilst a small minority were penalised for quoting answers to fewer than three significant figures in question 6(b). Most candidates made appropriate use of tables 1, 3 and 4 in the supplied booklet in answering questions 2, 3(a) and 5.

Question 1

Almost all candidates scored the first 3 marks by use of the appropriate functions on their calculators. The small minority who used formulae were less successful. Scoring full marks in part (b) was much rarer. Most candidates made sensible attempts but often struggled to find the appropriate terms to use. Some candidates stated values for the upper and lower quartiles but did not then state the difference as their value for the interquartile range. In part (c), general disadvantages of the mode and range were not acceptable answers. Whilst many candidates noted that no time occurred more than once so a mode did not exist, many fewer made explicit reference to the fact that the maximum time needed to calculate the range was unknown.

Question 2

Some candidates appeared to have no knowledge whatsoever of the binomial distribution. Of those candidates who did, many scored at least 6 marks. Almost all of them showed a correct expression in part (a) and then evaluated it correctly. Answers to part (b) often involved the usual confusion between '$\leq$' and '<' when using Table 1 but the majority of candidates were able to score at least 1 mark. In part (c), too many candidates either misread the request, or were under the impression that $np(1-p)$ gave the standard deviation.

Question 3

Most candidates scored at least 4 marks. The formula for the confidence interval was well-known and used correctly by most candidates; an incorrect z-value was the usual error. In answering part (b)(i), many comments observed that the mean for this play lay inside the confidence interval (as of course it must) and so the assumption was valid. This suggested anticipation on the part of these candidates of the type of comment that has been expected following the determination of a confidence interval on previous papers. In part (b)(ii), plays having different popularities or audience sizes were the most frequently seen acceptable reasons for the comment "Unlikely to be valid".

Question 4

This was perhaps the best answered question on the paper, with most candidates well prepared for this type of probability question. Almost all candidates scored at least 4 marks, most scored

at least 6 marks and many achieved the full 8 marks. Answers to part (a) were almost always correct with simple arithmetic slips the usual cause of a lost mark. Again in part (b), many candidates scored full marks. Those that did not either forgot to add in their answer to part (a) or made a numerical slip in the two new terms. In part (c), full marks were much less in evidence. In the main this was due to not fully understanding the phrase at "least one" and thereby omitting P(one) or P(three). Those candidates who realised that P(at least one) = 1 – P(none) invariably scored all 3 marks.

Question 5

In part (a)(i), apart from the small minority of candidates who standardised 44 (0 marks), most candidates scored all 3 marks. Again in part (a)(ii), many candidates scored all 3 marks. Those who did not score full marks usually recognised the need for 'answer (a)(i) – P($X < 30$)' but then failed to make the necessary area change from P($Z < -0.875$) to $1 - \text{P}(Z < 0.875)$. Whilst part (b) was a routine request, too many candidates equated $\frac{45-40}{\sigma}$ to 0.12, 0.88 or even 0.54776, rather than 1.175 from Table 4, and so lost 3 of the 4 marks. Those candidates who used a value between 1.17 and 1.18 invariably scored 4 marks. In part (c), many candidates failed to score marks by basing their decision on means and standard deviations rather than on their calculated and given probabilities. Those who did use the latter invariably came to the correct decision even if it was stated as Route Y rather than Route B. It was disappointing to find that some candidates apparently had little, if any, knowledge of the normal distribution.

Question 6

This proved to be a straightforward question for many candidates, with only part (c) causing a significant number of candidates any difficulty. As a result, marks below 10 were somewhat rare. In part (a), apart from occasional slips on individual points, plots were accurate. Almost all candidates found accurate values for the slope b and intercept a by using the statistical functions on their calculators, but a minority quoted b to only 2 significant figures. This unreasonably premature approximation lost a mark here and, through a knock-on effect, some accuracy marks in subsequent parts of the question. A considerable number of candidates found values for b and a using a formula approach with varying success, however they perhaps penalised themselves as regards time available for other questions. Most lines were plotted accurately although there was often little, if any, evidence of method. In part (c), some candidates correctly attempted to calculate the predicted value of y for $x = 480$ but then failed to turn this into a residual or had a sign error. Even the better candidates often omitted to make any subsequent comment or relate their result to their scatter diagram. Answers to part (d) were generally impressive with many candidates scoring full marks through use of their equation, scatter diagram or even a proportion argument. Those candidates who had used premature approximation in part (b) sometimes produced answers outside the acceptable limits.

Coursework Component

There were a few transcription and addition errors made when totalling the scripts. The final marks should be carefully checked prior to submission to AQA and for moderation. Scripts should be marked in red pen and calculations checked for accuracy.

There was some pleasing work seen. The interpretation strand still remains the weakest strand and candidates should ensure that all of the points are addressed in their scripts. In tasks involving confidence intervals, a clear description of what the interval is in context and a sensible comparison of any intervals (looking for any overlap etc) is expected for the highest marks.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.