AQA

AS
STATISTICS

SS1B Statistics 1B
Report on the Examination

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General

As in previous series, students were generally well prepared for the quantitative parts of questions but many continued to struggle with those parts requiring interpretation. Whilst there appeared plenty of scope for weaker students, the potential highest achievers struggled to achieve marks above 70. Almost all students made appropriate use of their calculators' standard in-built statistical functions in Questions 1, 2 and 5 and tables in Questions 3 and 6.

Question 1

Most students got off to what they considered to be a sound and probably encouraging start on this question involving correlation. Whilst errors in part (a) were rare, marks were often lost in part (b) for the use of 'strong' and absence of a reference to 'elephants'. With the former in mind, centres may find the following general guidelines helpful for the future.

- $0.9 < r < 0.99$ indicates (very) strong/almost exact positive correlation
- $0.7 < r < 0.9$ indicates strong positive correlation
- $0.3 < r < 0.7$ indicates moderate/some positive correlation
- $0.1 < r < 0.3$ indicates (very) weak/almost no (positive) correlation
- $0.0 < r < 0.1$ indicates no (positive) correlation
- Similar guidelines apply for negative values

Question 2

Full marks were very rare here. In part (a), it was disappointing to see a large number of students quote the value of the standard deviation, or even its square root, as the value for the variance. In part (b), most students correctly multiplied their (correct) mean value from part (a) by 0.354. However, almost all students did the same to their value for variance from part (a). As a result of these errors, 3 was the modal mark for this question.

Question 3

Most students were clearly well versed in the simple application of a normal distribution and so, using tables or sometimes calculators, they answered parts (a)(i) & (ii) correctly. Thankfully, fewer students than previously attempted calculations in part (a)(iii). In part (a)(iv), numerous students failed to realise that the answer could be obtained simply from answers to parts (a)(i) & (ii) and, of those who did, a minority simply subtracted their answers for (a)(i) from those for (a)(ii). There was less confusion than previously with parts (b)(i) & (ii) perhaps due to different values requested. In part (b)(i), a small number of students started afresh instead of using the result from part (a)(ii). Most students realised that the distribution of the mean was required in part (b)(ii) and as a result the overall standard of response showed improvement. A number of students stated, without method, an incorrect answer, presumably from an in-built function on their calculators, and so lost 4 marks.

Question 4

Students were clearly well prepared for a probability question based on a 2-way table and many students scored the full 9 marks in part (a). The most common, but not frequent, errors, were 45/150 or 45/400 in part (a)(iv) and 84/400 in part (a)(v). Part (b) clearly caught most students unaware with most students scoring minimal marks. It was not at all unusual to see 70/260 and 54/100 or divisors of 400, 399, 398 and 397 or even 404, 403, 402 and 401. The small minority of students who obtained correct probabilities of 70/400 and 54/400, then added them or their squares instead of multiplying and/or multiplied by 4 or 24 instead of 6.

Question 5

Almost all students used their calculators' in-built functions accurately in part (a) and it was pleasing to see the almost total absence of confusion between values for a and b. However, answers to part (a)(ii) were much less impressive with a number of students even suggesting that wing vibrations affected temperature – perhaps a new source of energy? The modal mark for part (a)(iii) was zero due to most students simply re-writing the statement in the question. To score marks, students were required to clearly contrast the given information that $y = 0$ at $x = 0$ with the equation predicting that $y = a > 0$ at $x = 0$. Answers to part (b) were very sound and, in part (c)(i), where a correct numerical value was frequently seen, far too many had the wrong sign. Perhaps of use for the future is the following aid used by a student: '**ROME**' for '**R**esidual' = '**O**bserved **M**inus **E**xpected'? Answers to part (c)(ii) indicated that almost all students were apparently unaware that $\sum_{i=1}^{n}(res)_i = 0$.

Question 6

Answers to this question showed that most students were well versed in the application of a binomial distribution. In part (a), a minority of students had errors in the formula or in its evaluation. Answers to parts (b) & (c) were generally correct although a small minority of students attempted, to no avail, separate calculations in part (c). It was pleasing to see the large proportion of students not fazed by $p = 0.85$. Success was often achieved by using a calculator's binomial cumulative distribution function or evaluating the five individual probabilities with $p = 0.85$. Fewer students took the alternative approach of using tables with $p = 0.15$ often with considerable or even complete success.

Question 7

In part (a)(i), too many students used the given value of 3972 as their value for s^2 or s. Students should have been aware of the correct relationship between $\sum(x-\bar{x})^2$ and s^2. Clearly an inability to find correct values for s^2 (and sometimes even $\bar{x}$) resulted in a major loss of marks. In part (a)(ii), it was not unusual to see 420 or even 410.04 (408×1.005) instead of 402. Even when 402 was seen, all too often it was compared with $\bar{x}$ instead of the lower confidence limit. In part (b), marks were only available for comparing 4 with 3 or 13 with 10; the frequent 4 or 13 alone scored no marks. In answering part (c), about half of the students identified correctly 'part (a)(i)' or an equivalent. Frequent incorrect answers were 'part (a)', 'nowhere' or even 'no idea'!

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator