FURTHER MATHEMATICS

General Certificate of Education (New)

Summer 2019

Advanced Subsidiary/Advanced

FURTHER STATISTICS B – A2 UNIT 5

General Comments

The standard for the first assessment of the GCE Further Mathematics A2 Unit 5 was very high. Candidates were able to demonstrate their knowledge and mathematical ability very well, with many scoring close to full marks. Candidates coped very well indeed with the demands of the new content, such as the non-parametric tests. However, there were some candidates that were out of their depth at this level. Some of the challenges included identifying the t-distribution and finding the confidence level for a confidence interval.

Comments on individual questions/sections

Q.1 Although this question was generally well answered, there were a significant proportion of candidates that failed to identify the need to use the t-distribution. There was also a large number of candidates who thought that the Central Limit Theorem was used.

Q.2 Part (*a*) was generally well done. This question did prove to be accessible to many candidates, with a considerable number able to score full marks. Unfortunately, there were also a few candidates who were unable to answer part (*b*) at all. A common error was to divide $\mathrm{E}(X)$ by 9 to find $\mathrm{E}\left(\bar{X}\right)$.

Q.3 This was another question that was generally very well answered. Part (*a*) was far less successful than part (*b*), with many candidates unable to commence the question. Part (*b*) was a familiar question and very well answered indeed.

Q.4 This question was the most poorly answered question on the paper. The vast majority of candidates were able to make a start on finding the confidence interval in part (*a*). Most were able to continue to find the correct confidence interval, although some misunderstood the mean weight gain as the total weight gain and therefore divided 900 by 12 and 870 by 10. Of the candidates that were able to calculate the confidence interval, only a few were able to interpret the interval correctly. An extremely common incorrect answer was stating that protein powder A was better than protein powder B because most of the interval was positive. Part (*c*) was very poorly attempted. Of the few candidates that knew that they had to form an inequality in terms of k and set it greater than 0, some failed to double the calculated value before subtracting it from 100%. Several sensible answers were given for part (*d*).

Q.5 This was the most successfully answered question on the paper, despite the fact that many candidates found explaining the appropriateness of a Wilcoxon signed rank test challenging. Another common error was the omission of the word 'average' in the hypotheses. Some candidates seemed extremely well versed in answering a question on this topic.

Q.6 The required thought and insight in part (*a*) was lacking for the most part. Some candidates simply stated "Hopcyn wants to see if it's less than 123. The company wants to see if it's less or more." A more considered, in depth answer was required. Candidates made a number of different errors in part (*b*). Some made errors calculating s^2, whereas others made errors calculating the *p*-value. However, many candidates were able to produce fully correct solutions.

Q.7 This was an extremely well answered question. The only errors that appeared with any regularity were the omission of the word 'median' or 'on average' and stating the critical region as $U > 48$ or $U < 8$.

Q.8 This question offered candidates several opportunities to recover from any previous loss of marks, with the inclusion of several part questions which asked candidates to show various results. As a result, there were many fully correct solutions seen for this question. The most challenging parts were parts (*c*) and (*d*). Candidates that did not recognise the binomial distribution with the correct parameters found the subsequent parts of the question very difficult.

Summary of key points

- It was encouraging to see so many scripts of a very high standard.
- Candidates were able to go through the processes required for non-parametric tests well, but should be more familiar with why they are used and the conditions required in order to carry out the tests.
- Candidates are encouraged to give more thought and consideration to the explanations they give, to ensure they are linguistically coherent and as insightful as possible.