Examiners' Report

Principal Examiner Feedback

January 2021

Pearson Edexcel International A Level

In Statistics 3 (WST03)

Paper: 01 Statistics S3

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General

This paper was accessible to all candidates with all of the questions having opening parts that all prepared candidates should have been able to engage with.

Comments on individual questions

Question 1

Most students listed 7 numbers in part (a) and often had 4 correct values. However there were many cases of repeats either of the 33 given in the question or of 29 indicating that many students did not understand how to use the table of random numbers to select a sample. Part (b) was rarely correct, even those who had the correct set of numbers in part (a) often failed to show how to use these numbers to select a stratified sample. There were some correct responses in part (c) where even those with an incorrect answer to part (a) could identify their highest number and deduce that therefore older players may not be represented in the sample.

Question 2

Part (a) was nearly always correct with only very rare arithmetic slips or errors in rankings. In part (b) most gave the hypotheses in terms of ρ and usually the alternative hypothesis was one-tailed. The correct critical value was usually stated and most gave a correct conclusion in context with only a few stating that the test was significant and concluding that there was therefore no evidence to support the teacher's belief. Part (c) was looking for a realisation that evidence of a positive correlation does not imply that enhanced short term memory causes improved mathematical ability. This was rarely commented on and many students felt that the positive correlation supported the teacher's argument.

Question 3

Part (a) was answered very well with many scoring all 4 marks. Sometime the degrees of freedom was incorrect but the corresponding critical value was usually given. Part (b) and part (c) were usually correct but part (d) proved more challenging with comments being too vague. Some realised that small expected frequencies were relevant but rarely showed that the critical cell was music from school *C*. Those who did identify the value in this cell and state that because it was less than 5 some pooling was required did not make it clear that the director had

pooled music with another club (or that columns were combined) to get a 3x3 table. However many were able to complete the test in part (e) and give a fully correct contextual conclusion.

Question 4

There were very few errors seen in part (a) and most gained full marks here. In part (b) the hypotheses were usually correct and most found the correct test statistic though there were some making errors in the denominator. The most common approach was to use the critical value from the tables and most conclusions were correct and included the context. Good answers to part (c) were rare. Some students calculated the two confidence intervals so we had sight of the key values of 63.2 and 58.3 but few were able to start with suitable inequalities and therefor had no mechanism for selecting the correct answer. Even those with the correct inequalities were sometimes unable to work out which was the critical one and selected 63.2

Question 5

Apart from a fully correct statement of the hypotheses, some missed mention of the length of pine cones and others failed to include the parameters of the normal model, there were many good solutions to part (a) leading to a test statistic in the acceptable range. Sometimes the degrees of freedom were incorrect but generally this was answered well. Part (b) was answered very well too but in part (c) many did not give the correct degrees of freedom and some failed to give a suitable context in the conclusion. Only the weaker candidates in part (d) used a mean of 6 and many scored both marks here.

Question 6

Part (a) was usually answered correctly with occasional errors made from considering an incorrect inequality for their variable (for $D = Y - R$ the probability $P(D > 0)$ was required). The candidates' use of correct notation and clear working in part (b) was poor. Many wrote $3R$ when they meant $R_1 + R_2 + R_3$ and in some cases this led to a correct distribution for $L = 4Y - (R_1 + R_2 + R_3)$ or a suitable equivalent. Again selecting the correct probability, $P(L > 0)$ in this case, seemed a bit hit and miss but there were a number of correct answers seen though the working was not always very clear or technically correct. Part (c) was a bit different but many students were able to score the first 3 marks for deriving the equation $15a + 12b = 780$ and the expression $\text{Var}(X) = 2.25a^2 + 0.64b^2$ but many solutions stopped at this point. Most successful solutions were based on forming an expression for $\text{Var}(X)$ in terms of one of the variables and

then using differentiation, completing the square or the axis of symmetry of the quadratic curve to find the value of a or b required.

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