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Examiners' Report October 2025

International Advanced Level in Statistics

WST02/01

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General Comments

Overall, this paper worked as expected with learners of all ability levels being able to demonstrate their knowledge. Good attempts were seen at all questions with higher achieving responses using correct mathematical notation and answering questions in context. Questions 6 and 7(b) proved the most challenging amongst responses on the entire paper.

Question 1

Questions which require worded answers proved to challenge learners, despite this being routine specification vocabulary.

Part (a)

Many incomplete answers were seen here – including a partial list of members, or simply all the members without referencing a list. Some thought it was a list of the member's opinions. Others proposed an appropriate sample size for the investigation.

Part (b)

This was better attempted than part (a). Some responses still think that it is the opinions of the members rather than the members themselves that are the units.

Part (c)

On the whole, most responses were able to correctly identify a suitable advantage and disadvantage of taking a sample rather than a census. Some clearly labelled their answers and provided a suitable reason disadvantage and advantage of using a census.

Question 2

Part (a)

Most learners found the mean correctly, but few progressed from there. Some did realise that the mean and the variance were equal but did not know how to use the summary statistics to justify this. Others responses gave generic answers about independence and constant rate.

Part (b)

Many responses got full marks for (b)(i). Though there were still a significant number of slips with the inequality signs.

Part (b)(ii) was less well answered with many unable to deal with an 'in between' probability. A variety of incorrect approaches were seen here.

Part (c)

This hypothesis test was generally well done. The most common error was a loss of the accuracy marks for mixing probability and CR approaches. Some used lambda equals 2 throughout and did not compute a correct p-value. Most were able to give sufficient context in their conclusion about the **rate** being greater than 2 per day.

Question 3

Overall, this question on sampling distributions was well attempted and provided a good source of marks for many learners.

Part (a)

This was another question which required a worded response, and many struggled to give a complete answer with enough clarity. Learners are encouraged to make good use of past mark schemes to ensure that they are answering definition questions accurately.

Part (b)

Nearly all responses were able to list all of the required samples of 3 here.

Part (c)

Again, nearly all learners answered this part correctly. Only on rare occasions was a total given rather than a mean.

Part (d)

Those who found p and q correctly generally went on to achieve all the marks here. A surprising number couldn't find q after finding p, and some inevitably failed to multiply by 3 when finding probabilities.

Part (e)

For those who identified the two possible values of the mode, this was very well done, correctly using the calculated probabilities from part (d). The most common error was either to allocate 0.5 as the probability to each outcome or using different combinations of samples from (b) to associate with each value of m.

Question 4

Part (a)

This was generally the source of 2 marks with learners correctly realising the need to use the fact that either F(10) = 1 or F(6) = $\frac{2}{3}$. Correct substitution was generally seen leading to the final given answer. A small number of learners obtained the given answer using the longer method of integrating each part of F(x) with the relevant limits and setting equal to 1.

Part (b)

Very few learners were able to identify that as this was a continuous random variable then P(X = 4) = 0. Many incorrectly attempted to calculate just F(4) giving an answer of $\frac{1}{3}$ others calculated P($X \leq 4$) – P($X \leq 3$) as if this was a discrete random variable.

Part (c)

Many learners could correctly identify the requirement to use F(4.5) – F(2.5) + F(8.5) – F(5.5)

Unfortunately, some responses then went on to substitute their value into the incorrect part of the cdf and therefore lost accuracy.

Part (d)

This was a source of marks for many learners who were able to differentiate the functions correctly. A common error was to do with a sign error rather than an error with any differentiation $s(x)=\frac{1}{24}x+\frac{5}{12}$ was a common error here.

Question 5

Part (a)

This part was generally answered well with a large number of responses able to correctly identify $P(X > 4) = 1 - P(X \leq 4)$ however a common error was to mistakenly use $P(X > 4)=1 - P(X \leq 3)$.

Part (b)

Those learners who started by using $1 - P(X = 0) > 0.95$ generally went on to score at least two marks on this part of the question. Unfortunately, some either left their final answer as 10.4 or incorrectly went on to state that the least number of tulips was 10 rather than 11. A common incorrect method seen was to state $P(X = 0)+P(X = 1) > 0.95$

Part (c)

Most learners were able to correctly utilise the normal approximation although there were a large number who either used the Poisson approximation or who chose to change to the Poisson and then the normal distribution. The most common error in this part of the question was the continuity corrections which were either not used at all or incorrect. It was reassuring to see that most

responses were showing all steps for this type of question, standardising their values with their mean and standard deviation that had been identified in their chosen model at the start of the question.

Part (d)

Hypotheses were often correctly identified but there were a few learners using x rather than p or no parameter stated at all. Those responses using a p-value approach were generally most successful, the most common error was the use of $P(X = 10)$ rather than $P(X \geq 10)$. Those learners embarking on a critical region approach often omitted the step where the CR was actually identified so lost this accuracy mark. The conclusion was usually stated in full context although the word 'red' was sometimes missed.

Question 6

Part (a)

This was the most discriminating part of the paper with many responses only scoring 1 mark for finding E(X) but nothing else. Very few could write down a useful expression for the area and hence made little progress. Those who used formulae had a higher success rate than those who opted for an integration approach. For those going down an integration approach, many multiplied by x instead of 1/20. For those opting to use the formulae, some simply believed the $E(X^2)$ was the required answer incorrectly believing that the area of the required shape was X^2.

Part (b)

Of those who achieved full marks in part (a), most nearly always seemed to go on and answer the whole question correct. Those who oversimplified part (a) were unable to access any marks here as we required an expression in terms of X for the area. On rare occasions, 5 was used instead of $5X^2$.

Question 7

Part (a)

This was generally shown correctly with all steps of the solution shown. The most common source of lost marks was from responses which did not show how the answer of 2.165 could be obtained from the equation obtained after integrating and substituting in their limits. Another common error was the use of trial and error to obtain the given answer, many learners using this approach did not use enough decimal places, choosing to substitute $m = 0.216$ and $m = 0.217$ rather than 0.21645 and 0.21655

Part (b)

This part was invariably incorrect. Whilst many learners realised the requirement to integrate $\frac{1}{y} \times$ f(y) this was often simplified to y^{-4} rather than y^2 and this was also seen in $\frac{1}{y^2}$ x f(y) which was often simplified to y^{-5} rather than y. Some learners also changed y^3 to y^{-3}. Many believed they could deal with the reciprocal after the integration rather than before it.

Part (c)

The final part of the paper was often fully correct even when there were no other marks scored in this question. Some learners incorrectly multiplied their $\text{Var}(\frac{1}{Y})$ by 4, –5 or just 5.