Principal Examiner Feedback

January 2017

Edexcel Award in Statistical Methods
Level 3 (AST30)

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Introduction

There was no evidence to suggest that students had difficulty completing the paper in the given time.

The vast majority of candidates completed their answers in the spaces provided and many showed the steps in their working.

Some candidates did not learn all the required formulae for the examination. It was pleasing to see so many students showing the intermediate stages in their calculations.

Reports on Individual Questions

Question 1

Part (a) was answered well by the majority of the candidates who were able to give a correct reason as for not using a census.

Part (b) was not answered well by the majority of the candidates who could not give a correct reason. A common incorrect answer given was 'people in Wales'.

Part (c) was answered well by the majority of the candidates who were able to give a correct reason as for obtaining primary data for the sample.

Question 2

Part (a) was generally answered well. Many candidates were able to draw a back-to-back stem and leaf diagram correctly but some lost marks by not writing down the two correct keys.

Part (b) was answered well. It was pleasing to see many candidates using the correct language in comparing their mean/median, range/IQR and skew. Many candidates did not just write down these values and they were both precise and explicit in their comparisons.

Question 3

Part (a) was answered well. Majority of the candidates gave a correct answer.

Part (b) was not answered well by the candidates as they did not use the midpoint to work out the mean. A common error by some candidates was to use the upper or lower limits to work out the mean.

Part (c) was not done well. Few candidates were able to recall or apply correctly the formula for calculating the standard deviation of a frequency distribution.

Question 4

Part (a) and (b) was answered really well by the majority of the candidates. Many candidates clearly showed their methods clearly.

Question 5

Part (a) was answered well by many candidates. It was encouraging to see correct probabilities on the tree diagrams.

Most candidates were able to answer part (b). The common error was to add rather than multiple the probabilities.

Only the most able answered part (c) well. A common error was to add the probabilities instead of multiplying. It was disappointing to see that these candidates did not recognise that this was an incorrect method as it gave them a probability greater than 1.

Question 6

Part (a) was answered well. Most candidates were able to complete the Venn diagram correctly.

Part (b) was answered well. Most candidates followed through their answers from the Venn diagram to gain the method mark. It was pleasing to see candidates answering conditional probability questions well.

Question 7

Part (a) was answered well. Many candidates realised they had to calculate the chain base index number for 2015 as $\frac{12850}{12345} \times 100$ and then obtained the correct answer. A few candidates calculated $\frac{12345}{12850} \times 100$ which is an incorrect method.

Part (b) was answered well by many candidates who were able to calculate the geometric mean of the index numbers. Some candidates calculated the *arithmetic* mean of the index numbers rather than the geometric mean or some candidates included 100 in the calculation of the geometric mean.

Part (c) was answered well by the majority of the candidates. Most candidates were able to interpret the answer in the context of the problem, however, sometimes omitting to describe the increase as a specified percentage.

Question 8

This question was answered quite well. Many candidates were able to work out a correct estimate for the number of turtles in a lake. Some candidates prematurely rounded their answer to 9 ÷ 70 to two decimal places before

dividing it into 60, however, this did not have an significant effect on the final answer. It was encouraging to see many candidates gave a correct assumption.

Question 9

It was pleasing to see many candidates using the correct language to compare the distribution of the diameters. Many candidates gained at least two marks from this question. Generally the two marks were gained from comparing the median and range/IQR correctly. A common error by some candidates was to state the skew incorrectly as East Park is negative and West Park is positive.

Question 10

Generally this question was well answered. Many candidates gave clear methods such as approaching the question by drawing a tree diagram. Some candidates did not identify that this is without replacement probability. These candidates should realise that 1 needs to be subtracted from the numerator and the denominator.

Question 11

Part (a) was done well. Most of the candidates were able to describe the trend shown by the moving averages. Candidates should be advised that the correct word to describe the trend here is downwards, and that e.g. "decreasing" and "negative" are merely condoned.

Part (b) was done quite well. Many candidates were able to estimate the required mean seasonal variation for quarter 2. A common error was not being able read the correct scale.

Question 12

Part (a) was generally answered well. Many candidates were able to calculate the standardised score for Harry's throw.

Part (b) was done as well. It was encouraging to see many candidates calculating the Jeremy's distance as 52.5

Part (c) was done well by a minority of the candidates. Many students still cannot interpret standardised scores. A common incorrect answer was to say that Kevin through further as his score is closer to zero or to the mean value.

Question 13

Part (a) was answered well. Many candidates could show that 85 is an outlier by using a formal method of identifying outliers. Candidates should be advised that, for a 'Show that …' style question, they should show all the intermediate stages in their calculations.

Part (b) was answered well. Many candidates drew the box plot correctly with an outlier. Some candidates who did not show that 85 is an outlier drew the box plot correctly.

Question 14

This question was answered well. In part (a), most candidates were able to recall and use the formula to calculate Spearman's coefficient of rank correlation. It was encouraging to see many candidates clearly showing all the steps to a correct answer.
In part (b), most candidates were able to state and interpret correctly the value of their correlation coefficient.

Question 15

Many candidates answered part (a) well, many candidates could recall the formula for the binomial distribution and apply it correctly. Some candidates made the common error of writing 0.95^{10}.

Part (b) was not answered well as many candidates did not add the probability from part (a).

Question 16

Many candidates did not answer part (a) well. These candidates simply found the z value and did not look this up in the tables. A common error was to find 1 – 0.4 and give the final answer as 0.6

Part (b) again was not answered well. Many candidates were able to standardise but did not look up the z value in the tables. A common error was to find 1 – 0.75 and give the final answer as 0.25

Question 17

Part (a) was answered well. Most students were able to find $\sum x$ and $\sum y$ then substitute the values in to the equation for S_{xy} to obtain -604.9. Many students recalled the formula for the product moment correlation coefficient correctly and obtained the correct answer of – 0.817.

Part (b) was answered well by many candidates. Many candidates stated the correlation and then gave a correct interpretation of the value found in part (a).

Question 18

Part (a), many candidates did not understand conditional probability. Many candidates did not score any marks in this part.

Part (b), many candidates did not understand independent events. Many candidates did not multiply the probabilities to find the answer.

Part (c) was poorly attempted by the candidates. Many candidates failed to recall the formula for the addition rule.

Question 19

Part (a) was answered poorly. Many candidates could not sketch normal curves. Some candidates who did draw them correctly failed to label them.

Part (b) was answered well. Many students were able to give two correct comparisons for salmon and trout.

Summary

Based on their performance on this paper, students are offered the following advice:

- Read the question fully and carefully before attempting to answer it.
- Show working out to support the final answer.
- Know how to calculate the standard deviation.
- Write down the answers given by calculators to at least 2 decimal places but to use accurate unrounded values in calculations.
- Be both precise and explicit in comparisons of distributions.
- Check to see if answers make sense in the context of the problem.
- For a 'Show that …' style question, students should show all their intermediate stages in the calculations not just the substitution stage.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx