

# Principal Examiner Feedback

Summer 2014

Pearson Edexcel Level 3 Award  
In Statistical Methods (AST30)

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# **Edexcel Award in Statistical Methods (AST30)**

## **Principal Examiner Feedback – Level 3**

### **Introduction**

There was no evidence to suggest that students had difficulty completing the paper in the given time. The vast majority of students completed their answers in the spaces provided and many showed the steps in their working.

Some students did not learn all the required formulas 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 generally answered well with many students scoring at least 1 mark. Many students were able to give a reason for sampling and suggest a suitable sampling frame. A common error was when students failed to realise that a sampling frame should be a 'list' of students.

Part (b) was done well and a variety of answers were given. Many students understood the sample was biased.

#### **Question 2**

This question was answered well. Many students wrote down the correct method and obtained 6.75. A few students did not round the answer to 7

#### **Question 3**

Those students that could recall the correct formula went on to score full marks but too many students were not able to recall or apply correctly the formula for calculating the standard deviation of a grouped frequency distribution. A few students forgot to square root the variance.

#### **Question 4**

Part (a) was generally answered well. Many students 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 not done well. Many students did not make correct comparisons. In questions like this, students should compare the mean/median/mode, range/IQR and skew not simply stating the values. Students should be advised to be both precise and explicit in their comparisons.

### **Question 5**

Part (a) was answered well. Many students were able to find the median and calculate the interquartile range.

Part (b) many students could show that 39.5 is an outlier by using a formal method of identifying outliers.

Students should be advised that, for a 'Show that ...' style question, they should show all the intermediate stages in their calculations.

Part (c) was answered well. Many students drew the box plot correctly with an outlier. Some students who did not show that 39.5 is an outlier drew the box plot correctly.

Students should be advised to check the scale given before plotting their values.

### **Question 6**

Part (a) was not answered well. Most students identified only four of the eight possible combinations.

Part (b) was not answered well as too many students failed to realise that when 2 dice are thrown together there are 36 possible outcomes.

Part (c), most students were able to score 1 mark as they knew that they needed to use their answer in part b and multiply by 180.

### **Question 7**

This question was answered quite well. In part (a), many students were able to work out a correct estimate for the number of frogs in a lake.

Part (b) was done better than in previous series. Many students gave correct assumptions but some students gave reasons that were based on their method of calculating the estimate rather than on any underlying assumptions inherent in the Peterson method.

### **Question 8**

Part (a), many students scored this mark but students should be encouraged to use the correct words when describing a trend. Students still get trend confused with correlation.

Part (b), very few students were able to use the trend line to find the seasonal variation for quarter 2 of 2012

### Question 9

Part (a) was answered well with many students completing the tree diagram with correct probabilities and labels. A few students failed to use labels and lost one mark.

Part (b)(i) was answered well, many students writing down  $0.3 \times 0.2$  and obtaining the correct answer. It was encouraging to see that students were not adding the two values.

Part b(ii), most students knew that they needed to multiply and add probabilities with many correct solutions seen. A few students were confused on when to multiply and when to add probabilities.

### Question 10

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

In part (b), most students were able to interpret correctly the value of their correlation coefficient and make a sensible comment about its strength.

### Question 11

Part (a) was generally answered well. Many students were able to calculate the standardised score for Art and Music.

Part (b) was not done as well. Common incorrect answer here was 'Music, because the standardised score is further from the mean'.

Part (c) was generally done well by those students who scored well in part a.

### Question 12

In part (a), many students were able to explain what a chain base index number represents.

Part (b) was done well by some students. The common error was to use April as the base year rather than the previous month.

In part (c), many students were able to calculate the geometric mean of the index numbers. A significant number of students calculated the *arithmetic* mean of the index numbers rather than the geometric mean.

Part (d), few students were able to interpret the answer in the context of the problem, often omitting to describe the increase as an 'average increase' or that the figure was 'per month'.

### Question 13

Part (a) was answered well. Most students were able to complete the Venn diagram correctly, but some students omitted to include the number of people who did not like any of the cakes.

Part (b) was answered well. Most students followed through their answers from the Venn diagram to gain the method marks.

### Question 14

Part (a) was not done well by the vast majority of students. Those students that did try and draw normal distribution curves often forgot to label the two curves. Very few students had normal distribution curves that both started and ended in the correct place. Students that did know where to draw the two curves failed to appreciate that the spread affected the height of the curves.

Part (b) was answered well. As the figures were given in the table then students were able to give two correct comparisons for French and German.

### Question 15

Those students that knew how to calculate a probability from a binomial distribution generally scored all 3 marks. A few were able to score one as they recognised that they needed  ${}^{10}C_6$ . A significant number of students left this question out.

### Question 16

Part (a) was answered well. Most students were able to substitute the values in to the equation to obtain 9.726

Part (b) was not answered as well, some students obtained the correct answer by showing their method clearly but too many students could not recall the correct formula for calculating the product moment correlation coefficient.

Many students went on to interpret their part (b) correctly as positive correlation in part (c)

### Question 17

Part (a), too many students failed to realise that the answer was just  $P(A)$ . Many students did calculations that arrived at an incorrect answer.

Part (b), many students understood that for independent events they needed to multiply  $P(A)$  and  $P(B)$  and gave a correct answer.

Part (c) was not done well by many students as they failed to recall the formula for the addition rule.

## Question 18

Many students answered part (a) quite well by standardising and then finding  $P(Z > 1.29)$ . Some students did not subtract 0.9015 from 1, therefore, leading to an incorrect answer.

Part (b) was answered quite well. Many students were able to standardise and then were able to use the standard normal tables to find  $P(W < 89)$ .

Part (c) was not answered by many students. Those who did answer this part often went on to multiply their answers from part (a) and part (b) and obtained full marks. Some students added rather than multiplied their answers from part (a) and part (b).

## Summary

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

- Read the question fully and carefully before attempting to answer them
- 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
- To be both precise and explicit in comparisons of distributions
- Know the formula for the product moment correlation coefficient
- 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**

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<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>





