edexcel

Principal Examiner Feedback

Summer 2015

Pearson Edexcel Level 3 Award in Statistical Methods (AST30)

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2015
Publications Code EA042687

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 formulae for the examination. It was pleasing to see so many students showing the intermediate stages in their calculations. Some students did not use a ruler to draw the bars in the histogram in question 6.

Reports on Individual Questions

Question 1

Part (a) was generally answered well. Many students could state the type of data and give a correct advantage. In part (b), many students were able to calculate the mean number of tyres sold per customer and give the correct answer. Part (c) was not done well. Few students were able to recall or apply correctly the formula for calculating the standard deviation of a frequency distribution.

Question 2

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, range/IQR and skew, not simply state the values. Students should be advised to be both precise and explicit in their comparisons, e.g. comments such as ‘the treated yield of apples was more than the untreated yield of apples’ is insufficient as it is not true for all yields, whilst ‘the median of the untreated yield of apples is 28 kg and the median of the treated yield of apples is 42 kg’ is not a comparison.

Question 3

Part (a) was answered well. Many students wrote down the correct method and obtained 13.325. A few students did not round the answer to 13. Part (b) caused many problems. Many students did not realise that this is “without replacement” probability. Students should know that the second probability is not the same as the first.

Question 4

Many students answered this question well. It was encouraging to see correct probabilities on the tree diagrams. Most students 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 students did not recognise that this was an incorrect method as it gave them a probability greater than 1.

Question 5

Part (a) was answered well. Most students were able to complete the Venn diagram correctly. Part (b) was answered well. Most students followed through their answers from the Venn diagram to gain the method mark.

Question 6

This question was answered well. Many students realised they had to calculate frequency densities and they then drew the histogram correctly. It was pleasing to see students using a correct scale on the *y*-axis, however, some students did not label the *y*-axis as *frequency density* or *fd*.

Question 7

Part (a) was answered well. Many students realised they had to calculate the chain base index number for 2013 as $\frac{1020}{910}\times 100$ and then obtained the correct answer. A few students calculated $\frac{910}{1020}\times 100$ which is an incorrect method.

In part (b), many students were able to calculate the geometric mean of the index numbers. Some students calculated the *arithmetic* mean of the index numbers rather than the geometric mean and some students included 100 in the calculation of the geometric mean. In part (c), most students were able to interpret the answer in the context of the problem, however, they sometimes omitted to describe the increase as a specified percentage.

Question 8

This question was answered quite well. Many students were able to work out a correct estimate for the number of birds in a sanctuary. Some students prematurely rounded their answer to 12÷60 to two decimal places before dividing it into 70, however, this did not have a significant effect on the final answer. It was encouraging to see many students gave a correct assumption.

Question 9

Part (a) was done well. Most of the students were able to describe the trend shown by the moving averages. Students 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 students were able to estimate the required mean seasonal variation for quarter 1. Common errors were not being able read the correct value because the scale was not understood and omitting the negative sign.

Question 10

Part (a) was answered well. Many students could show that 66 is an outlier by using the 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 (b) was answered well. Many students drew the box plot correctly with the outlier. Some students who did not show that 66 is an outlier drew the box plot correctly.

Question 11

Part (a) was generally answered well. Many students were able to calculate the standardised score for Spanish and Mandarin. Part (b) was done as well. It was encouraging to see many students calculating the Russian score as 73.

Question 12

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 state and interpret correctly the value of their correlation coefficient.

Question 13

In part (a) many students did not understand mutually exclusive events and independent events. Part (b) was poorly attempted by the students. A common error in (i) was to multiply 0.45 by 0.4 to obtain 0.18. (ii) was not done well by many students as they failed to recall the addition rule correctly.

Question 14

Many students answered part (a) quite well by standardising and then finding $P(Z < 1.5)$.
Part (b) was answered quite well. Many students were able to standardise and then were able to use the standard normal tables to find $P(Z > 1)$. Some students did not subtract 0.8413 from 1, therefore, leading to an incorrect answer.

Question 15

Many students answered part (a) well. Many students could recall the formula for the binomial distribution and apply it correctly. Some students made the common error of writing $0.1 \times 0.9^{11,}$ but omitted to include 12 or ${}^{12}C_1$ as students did not realise a binomial coefficient was required. Part (b) was not answered well as many students did not add the probability from part (a). Many students made a correct attempt to answer part (c) by multiplying their part (b) answer by 125, thus gaining one mark.

Question16

Part (a) was answered well. Most students were able to find $\sum x, \sum y$ and $\sum xy$ and then substitute the values in to the formula to obtain 1063.2. Part (b) was answered well, many students obtained the correct answer by showing their method clearly. Many students went on to interpret their part (b) correctly as positive correlation in part (c).

Question 17

Part (a) was done well by the students. Many students could state the mean and standard deviation from the diagram. Part (b) was not done well by the vast majority of students. Very few students had the normal distribution curve starting and ending at the correct place. Some students that did know where to draw the curve failed to appreciate that the spread affected the height of the curve. Part (c) was answered well. Many students were able to give two correct comparisons for Factory A and Factory 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 it
- Show working out to support the final answer
- Use a ruler when drawing straight lines, as in histograms
- Know how to calculate a standard deviation
- Write down the answers given by calculators to at least 2 decimal places but use accurate unrounded values in calculations
- Be both precise and explicit in comparisons of distributions
- See if answers make sense in the context of the problem
- For a 'Show that …' style question, show all intermediate stages in 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

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE