Principal Examiner Feedback

January 2016

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

Edexcel Award in Statistical Methods Level 3 (AST30)

Principal Examiner Feedback

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.

The design of this paper and the performance of students on this paper were consistent with previous papers so allowing a pass mark of about 66% of the total mark to be considered as showing proficiency in Statistical Methods at Level 3.

Reports on Individual Questions

Question 1

Generally this question was done well. In part (a), virtually all the students were able to complete the sample space diagram to show all possible outcomes. In part (b), most of the students were able to find the required probability. In part (c), most of the students were able find an estimate for the number of outcomes. Those students that had an incorrect probability in part (b) were able to score the method mark in part (c).

Question 2

Generally this question was done well. In part (a), most of the students were able to complete the cumulative frequency graph correctly. Only a few students use the midpoint of the interval rather than the end point of the interval. In part (b), most of the students were able to use their cumulative frequency graph to find estimates of the median and the interquartile range. Some students did not show their working by drawing the lines for the quartiles on the cumulative frequency graph. In part (c), most of the students were able to draw a correct box plot from the cumulative frequency graph. However too many students lost marks for not reading the scale correctly and the main error seen was incorrectly plotting the shortest time.

Question 3

Part (a) was generally answered well. Many students were able to give a correct advantage and a correct disadvantage of using the internet to collect data. In part (b), many students were able to interpret the back-to-back stem and leaf diagram and find the missing quartiles. A common error was to find the median of action films as 120. Students should have realised that they had read the

diagram incorrectly as the lower quartile was given in the question as 121 so the median could not have been 120. In part (c), generally students who knew how to formally identify outliers scored both marks. A number of students were able to identify 95.5 as the boundary value for the outlier but then made no comparison with 90. Students should be encouraged to make sure that they answer questions in full.

Question 4

Generally this question was done well. In part (a), the majority of students were able to complete the probability tree diagram. Most students were able to answer part (b) correctly. The common error was to add rather than multiple the probabilities.

Question 5

Generally this question was done well. In part (a), most students were able to write down an advantage of taking a sample. In part (b), many students were able to suggest a suitable sampling frame. In part (c), most students were able to work out the number of people needed for the stratified sample. Here, as elsewhere, students should be advised to show the intermediate stages in their calculations.

Question 6

This question was answered quite well. In part (a), many students were able to work out a correct estimate for the number of deer in the forest. Part (b) was done better than in previous series. Many students gave correct assumptions.

Question 7

Part (a) was done better than previous series. Many students scored this mark but a few students got trend confused with correlation. Part (b) was not done so well. Only the most able students scored all 3 marks. Many students were able to score one mark as they were able to calculate the difference between the actual value and the trend line for at least one of the quarters. A common error was to calculate 19 – 18 rather than 18 – 19 for the seasonal variation of quarter 1 of year 3. Students should note that this question referred to money and as such the accuracy in their final answer needed to reflect this.

Question 8

In part (a), many students were able to calculate correctly the three chain base index numbers. Only a few students calculated fixed base index numbers. In part (b), many students were able to calculate the geometric mean. Common errors included finding an arithmetic mean or adding rather than multiplying their three numbers. Part (c) was not answered well. Only the most able students could give a correct interpretation of the geometric mean.

Question 9

In part (a), 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*. In part (b), many students were able to calculate an estimate of the mean. Part (c) was done better than in previous series but still too many students were not able to recall or apply correctly the formula for calculating the standard deviation of a frequency distribution.

Question 10

Part (a) was generally answered well. Many students were able to calculate the standardised score for Taylor. Part (b) was also done well. It was encouraging to see that so many students were able to give a correct reason for who threw the Javelin the further.

Question 11

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), many students were able to interpret their correlation coefficient correctly but a few students incorrectly thought that a correlation coefficient of 0 implied negative correlation.

Question 12

Part (a) was answered well. Most students were able to complete the Venn diagram correctly. A common error was to miss the 41 from the diagram. Part (b) was answered well. Most students followed through their answers from the Venn diagram to gain the method mark. A few students incorrectly thought that part (b) (iii) was a conditional probability and therefore gave an answer with an incorrect denominator.

Question 13

This question was not done well by the vast majority of students. In part (a), only approximately 50% of students recognised that the Venn diagram represented mutually exclusive events. The common error was to say that they represented independent events. In part (b), many students thought that C and D were independent events so multiplied $P(C)$ and $P(D)$ to give an incorrect answer of $^3/_{25}$. In part (c), very few students recognised that it was a conditional probability that was required and many students assumed the question was asking them to calculate $P(C) \div P(D)$ or $P(D) \div P(C)$.

Question 14

In part (a), only the most able students were able to score all 3 marks. Many students were able to score 2 marks by drawing a bell shaped curve centred on the mean. A few students lost the final mark as they drew curves which went below the *x*-axis. In part (b), only the most able students were able to score full marks. Many students did score 2 marks as they were able to standardise and obtain the values 0.75 and 1.75. In part (c) many students were able to give 2 correct comparisons. Some students did compare ranges which was accepted but students should be encouraged to compare standard deviations in these types of questions. A few students had obviously been trained to compare skew in questions that ask for comparisons to be made. In this type of question this is not an acceptable comparison as normal distributions are symmetrical.

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 1 mark as they recognised that they needed $^{12}C_2$.

Question 16

In part (a), many students were able to calculate S_{aa} correctly. In part (b), many students were able to calculate the product-moment correlation coefficient correctly. A few students forgot that the denominator needed a square root. In part (c), most students were able to score 1 mark because they could identify the type of correlation their answer in part (b) showed. Too many students repeated this answer in (ii) and failed to describe the relationship within the context of the question.

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