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# Principal Examiner Feedback

## January 2016

## Pearson Edexcel Level 2 Award in Statistical Methods (AST20)

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### Introduction

Most students attempted all the questions on the paper.

Many students showed the intermediate steps in their calculations.

There was a general improvement in the number of students able to quote the formula and calculate correctly (i) an estimate of the mean from a grouped frequency table and (ii) the standard deviation of a discrete data set.

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 2.

## Reports on Individual Questions

### Question 1

This question was done quite well. Most students were able to score at least 2 marks for drawing a two-way table showing all the entries in the correct places. A significant number of students either omitted to include one or both of the total column and total row or, if these were included, to write the overall total of the totals column and row as 52.

### Question 2

This question was generally done well. Most students were able to interpret the composite bar chart for the required information. A common error in part (c) was 11, the number of squares rather than the percentage interpreted from the scale.

### Question 3

In part (a), about two thirds of the students were able to classify weight as continuous data. A common incorrect answer here was “discrete”. Part (b) was not done well. Few students were able to complete the grouped frequency table correctly. Students should be advised to check the total frequency in the table with the amount of data they are given. A common error was to put 1100 in the

interval $1100 < w \leqslant 1150$ rather than $1050 < w \leqslant 1100$. Part (c) was not done well. Few students were able to score full marks for this question. Common incorrect answers include omitting to label the axes, joining the first point to the last point to form a polygon and plotting the points at the ends of the intervals.

**Question 4**

Part (a) was done well. Most students could describe the relationship between the variables. Common incorrect answers here were “positive” and “wingspan always bigger than body length”. Part (b) was not done well. Few students could work out the mean point of the data, and many of those that could were unable to plot it accurately on the grid. A significant number of students thought they were being asked to calculate a standard deviation. Part (c) was done quite well. Many of those students who were unable to find an accurate prediction for the wingspan of the butterfly were able to score a mark for drawing a suitable line of best fit.

**Question 5**

Part (a) was done well. Most students were able to decide if the dice is biased, generally by stating “yes”, and giving a correct reason for their decision. Students should be advised to state their decisions clearly, either “yes” or “no” before giving their reasons. A common incorrect answer here was “no, because 70 + 30 = 100”.
Part (b) was done quite well. Most students were able to score at least 2 marks for writing down the things that could be misleading or wrong in the diagram. A common incorrect answer here was “no unit”.

**Question 6**

This question was answered well. Most students were able to use the sample space diagram to find the required probabilities. A common incorrect answer in part (ii) was $\frac{9}{16}$.

**Question 7**

Part (a) was done well. Virtually all the students were able to identify the outlier in the data. Part (b) was not done well. Many students were able to interpret the stem and leaf diagram correctly to find the median, but relatively few were able to find the lower and upper quartiles. A common incorrect value for the lower quartile was 55. Part (c) was done well. Most students were able to draw a correct box plot for the values in their table.

**Question 8**

Part (a) was not done well. Relatively few students were able to interpret the time-series graph correctly to calculate the required 4-point moving averages. A common incorrect answer here was to calculate 3-point moving averages. Part (b) was done relatively well. Students should be advised to describe trends correctly as either “upwards” or “downwards” rather than “increasing” or “decreasing”. A common incorrect answer here was “highest in second quarter”.

**Question 9**

This question was done well. Most students were able to use the given information to calculate the required probabilities. A common incorrect answer in part (b) was 0.4 × 0.45, rather than 0.4 + 0.45. A common incorrect answer in part (b) was $\frac{9}{60}$, rather than 9.

**Question 10**

This question was done quite well. In part (a) most students were able to write down the modal class interval for the data. In part (b) most students were able to write down the interval that contains the median. A small number of students interchanged the answers to parts (a) and (b). In part (c), many students were able to work out an estimate for the mean height and give this to the nearest metre. Common incorrect answers here were (i) (6750 + 7250 + 7750 + 8250 + 8750) ÷ 5, (ii) 228 250 ÷ 5 and (iii) using the ends of the intervals to calculate $\sum fx$.

**Question 11**

Part (a) was done quite well. Students should be advised to draw a horizontal line from the cumulative frequency axis to the curve to show how they find the median of the data. A common incorrect answer here was to change 1.5 minutes to 1.30, presumably 1 minute and 30 seconds. Part (b) was not done well. Few students could interpret the cumulative frequency diagram to estimate the interquartile range for the boys. Common incorrect answers here were to calculate the interquartile range for the girls and to interpret 26.25 and/or 21.5 from the diagram as 26.15 and/or 21.30 in the calculation. Part (c) was done quite well. Many students were able to compare correctly the interquartile range of the boys with the interquartile range of the girls. Common incorrect answers here were “girls took more time” and “boys took less time”.

**Question 12**

Part (a) was done quite well. Most students were able to write down a suitable question with a suitable time frame and give at least three response boxes with non-overlapping exhaustive intervals. Common incorrect answers here were to omit the time frame and to omit 0 from the response boxes. In part (b), about half the students were able to work out the sample size for the stratified sample. Students should be advised to round their answers correct to the nearest whole number rather than simply truncating the decimal number, though truncated answers were accepted in this examination.

**Question 13**

Part (a) was done quite well. Many students were able to write down an advantage of taking a sample and/or explain why the sample may be biased. Common incorrect answers in (ii) were “because she is only sampling cars in her town” and “doesn’t include other types of transport”. Part (b) was not done well, though significantly more students were able to get this right than in previous sessions. A very popular misconception is that $\sum x^2$ is equal to $(\sum x)^2$.

**Question 14**

Parts (a) and (b) were done quite well. Most students were able to interpret and complete the histogram for the required information. Some students had difficulty interpreting the scale on the frequency density axis. Part (c) was not done well. Few students could describe the skew of their histogram. Common incorrect answers here were “negative” and “decreasing”.

**Question 15**

This question was generally done well.
In part (a) most students could complete the tree diagram with the correct probabilities. In part (b), many could calculate the required probability by multiplying the probabilities from their tree diagram. A significant number of students, having written down the correct calculation $\frac{3}{5}\times\frac{2}{5}$, were unable to do the work it out correctly. Common incorrect answers here were $\frac{6}{10}$ and $\frac{5}{10}$.

**Question 16**

This question was done quite well. Most students were able to calculate and compare the mean time taken by the boys and the girls. Most students showed their work and gave either a comparison of the means, e.g. “greater for girls” or a comparison in context, e.g. “boys faster”. A common incorrect answer here was to compare 47 × 1275.75 with 28 × 907.5. In part (b), about half the

students were able to calculate the combined mean time taken for the runners. A common incorrect answer here was (1275.75 + 907.5) ÷ 2

**Question 17**

Part (a) was not done well. Few students could calculate the required index number for the council tax. Common incorrect answers here were (i) 1.14, i.e. omitting to multiply the ratio by 100, (ii) $\frac{945}{1078} \times 100$ and (iii) $\frac{133}{945} \times 100$. Some students gave their final answer incorrectly as £114.1.

Part (b) was done quite well. Most students were able to show that the percentage increase in the council tax between 2005 and 2010 was greater than 5%, e.g. 5.15%, or explain that both the index numbers for 2005 and 2010 were based on 2000. A common incorrect answer here was to work out 5% of 108 and add it on to 103.

**Summary**

Students should be advised to

- state their decisions clearly, either “yes” or “no” before giving their reasons
- describe trends correctly as either “upwards” or “downwards” rather than “increasing” or “decreasing”
- draw a horizontal line from the cumulative frequency axis to the curve to show how they find the median of the data
- round their answers correct to the nearest whole number rather than simply truncating the decimal number.

**Grade Boundaries**

Grade boundaries for this, and all other papers, can be found on the website on this link:
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