Pearson

Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International A Level Mathematics

In Statistics S1 (WST01/01)

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General Introduction

There were opportunities on this paper in all the questions for all students to make some progress but questions 3(b), 4 (c)(ii), parts of question 5 and 6(d) proved to be more challenging. The questions requiring a comment or explanation in words were often not answered very well and sometimes not even attempted.

Report on Individual Questions

Question 1

Part (a) was a very friendly starter to this paper and it was rare to see an incorrect answer here. In part (b) the coding caused problems for some, but most were able to find the correct gradient. The most successful approach was to find the regression of y on x and then use the given coding formulae to reach the equation of the regression of h on f. Those who tried to find this equation directly often came unstuck when trying to find $\overline{f}$. Many lost the accuracy mark for a because they did not use sufficiently accurate figures in their working to get a = 820 to 3 significant figures. Responses to part (c) often failed to give the values of the estimates or give an answer describing each of the variables using suitable words but most students knew what to do in part (d) and the range of answers accepted meant that many of those who lost the accuracy mark in part (b) could gain both marks in (d).

Question 2

The correct frequencies for part (a) were often seen in the table often with little or no working. Many other incorrect values added up to 80 and so the B1ft mark could be awarded but a fairly common answer of 97.5 and 45 scored no marks. The vast majority of students scored the mark for finding the mean in part (b) and it was encouraging to see more students using a correct formula for standard deviation, but confusion with variance was still quite common, but few worked with an unrounded mean and the final answer was often not correct to 3 significant figures. Part (c) was answered quite well this time with many fully correct answers and others having a suitable diagram and equation but losing some accuracy or having an incorrect end point. Questions like part (d) that ask for a reason are often omitted on IAL papers, but it was encouraging to see a good number attempting this and many giving a correct response with an appropriate reason. Some used a formula but most simply stated that the mean was greater than the median as intended. Part (e) less familiar and received a mixed bag of responses. Some got the 78 and often then the probability of 0.3 but this was usually simply cubed (the students failing to appreciate the "without replacement" feature of this sampling procedure) and other, weaker students simply multiplied 0.3 by 3. A few students who did have a product of 3 correct probabilities sadly lost the final mark because they gave their answer as 0.026 rather than the correct fraction or 0.0263

Question 3

The majority were able to answer part (a) correctly and this standard calculation using the normal distribution is regularly answered well by over 80% of students. Part (b) was more demanding though many were able to gain two marks for finding P($X > 45$) = 0.2743 The major error was a failure to find the probability that Jenny qualified for the final which could simply be written down as $1-(a)^3$ and those who did find this probability were usually able to identify the required conditional probability and achieve a correct answer however only 4% achieved full marks here.

Question 4

Although 0.72 was the most common answer offered for part (a) there were a surprising number who picked one of the other two values. Students could benefit from more exposure to scatter diagrams and their associated correlation coefficients. The interpretation of the scatter diagram required in part (b) had a mixed response too with most choosing C but many opting for D instead and occasionally we saw H. In part (c) most knew how to use the relevant formulae but disappointingly a large number of students used $n = 10$ rather than $n = 8$ but the method marks were still available to them. Rounding errors saw others who had the correct calculation giving their final answer as 0.905 or 0.91 rather than 0. 906.The final part was not answered well and only a minority of students interpreted the value of r correctly. They knew it meant strong positive correlation but could not interpret this in terms of the times taken to run the two races.

Question 5

It was surprising to see so many students giving their answers to this question as frequencies rather than probabilities. Students should be familiar with the P(D) notation for probability and shouldn't be confusing it with the n(D) notation for the number of elements in a set that they used in International GCSE. In part (a) most scored the marks for (i) and (ii) but part (iii) was not answered well with $\frac{24+32+20}{320}$ being a common incorrect response. There was more success in part (b) with many students identifying the conditional probability and this is a great improvement from the situation a few years ago. Part (c) was answered very well although many students gave 2 or all 3 pairs of mutually exclusive events. Responses to part (d) were generally better too. The most common approach was to use $\mathrm{P}(D) \times \mathrm{P}(X) = \mathrm{P}(D \cap X)$ but a number used a conditional probability approach and often successfully. It was good to see fewer students losing marks for failing to label their probabilities or give a clear conclusion. There were a number of good responses to part (e). A few did not seem to appreciate what "in the context" meant and simply referred to not D and Z but most managed to score the mark in (i) and in (ii) they realised that the household had a driveway but some thought it referred to 1 or 2 cars and others lost the final mark for incorrect use of the word "and" in comments such as "the household has a driveway with 1 car and no cars".

Question 6

In part (a) a good proportion of students found a correct equation using 3.968 but the equation using 4.026 was more challenging and fewer achieved a correct second equation with a z value of 1.03 being a common "near miss" that could still achieve the final mark in this part. Those with a correct pair of equations usually had little trouble in solving to find μ and σ. Those who could start part (b) were often able to make significant progress but a majority made no progress here. Realising that the normal distribution is symmetric meant that Q_3 should have been a simple write down but many used the normal tables (or their calculator) to find this value and this often meant that their quartiles were not quite symmetric which increased the amount of work required. The calculation of outlier limits should have been a straightforward calculation and those who got this far were usually able to standardise and calculate at least one of the required probabilities. Because of the variety of different approaches available to find Q_3 we had a wide range of acceptable answers for the final probability which meant that minor errors in rounding were sometimes condoned.

Question 7

Almost all students were able to make some progress here with only 6% scoring 0 and over 90% scoring 13 or fewer marks. In part (a) the vast majority could find a suitable equation based on $E(X) = 2.5$ but a significant number failed to use the sum of probabilities = 1 to form a suitable second equation. Being a "show that" question we needed to see a clear method to solve two linear equations in a and b to score all the marks and whilst many did provide clear evidence a number simply wrote down the given answer and lost marks as a result. Part (b) was answered very well with a majority of students gaining full marks. The usual error of subtracting $E(X)$ instead of $[E(X)]^2$ still occurred occasionally and some still don't know the Var $(4X + 3)$ formula. A number of students did not attempt the last two parts but those who did engage with this context were usually able to score the marks in part (c) and often went on to find $60E(Y)$ which scored a couple of marks. Only the very best students defined the new variable W = the profit per customer and went on to calculate $E(W)$, the value of W when $Y = 5$ or 6 causing the biggest problems.

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