Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International A Level

In Statistics 1 (WST01)

Paper: 01 Statistics S1

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General

This paper was accessible to all candidates with all of the questions having opening parts that all prepared candidates should have been able to engage with. The final question was the most challenging, but many students were able to pick up some marks here for the calculations in parts (b) and (c).

Comments on individual questions

Question 1

This proved to be a good introductory question to the paper with many students scoring full marks. There were occasional arithmetic errors in part (b) and some misunderstanding where the 0.17 was included. In part (c) some students are still unsure how to interpret a conditional probability and we occasionally still saw $\frac{0.35\times 0.4}{0.4}$ or $\frac{0.35}{0.4}$

Question 2

This was another very accessible question making the start of this paper a rich source of marks for many students. Part (a) was usually correct as was part (b) but occasionally here some students calculated the correct positions of the quartiles and found the difference between these rather than the values of the quartiles themselves. A few seemed not to appreciate that IQR was the difference between the quartiles and simply gave the two quartiles as their answer. There were a surprising number of errors in part (c) with some multiplying the quartiles by 1.5 and others using $\left[Q_1 + 1.5\times \text{IQR}\right]$ for the lower limit. A number of students failed to identify the outlier in this part and lost a mark though they usually drew a correct box plot in part (d). The box plot was often drawn correctly though a surprising number had their upper whisker drawn to 98 (the upper limit) rather than 97 the highest value in the data set.

Question 3

Part (a) was answered very well with most students standardising correctly and the majority realising that they then needed to subtract the value found in the tables from 1. There were a good number of correct responses to part (b) too but many students were using a *z* value of 1.03 or 1.04 rather than the value 1.0364 from the "Percentage Points of the Normal Distribution"

table and they lost a mark for the reduced lack of accuracy. Others gained this mark but were using – 1.0364 an error that could probably have been avoided if they had drawn a suitable diagram. Some students are opting to use calculators for this sort of question and invariably they fail to show sufficient accuracy to gain full marks. Part (c) was much more challenging and many did not realise that a conditional probability was required. Those who did attempt a ratio of probabilities often struggled with the numerator: few wrote down $\frac{\mathrm{P}(18 < W < 23.6)}{\mathrm{P}(W < 23.6)}$ with $\frac{\mathrm{P}(W > 18)}{0.85}$ being a common error and many decided to forego any use of probability statements and simply wrote down a ratio of probabilities but there were a number of correct attempts of the form $\frac{0.85 - 0.5}{0.85}$ which usually led to the correct answer. Part (d) proved the most difficult part of this question. There were a number who wrote down $0.15^2 \times 0.85^2$ and some multiplied by an integer k but this was invariably 4 not 6 however some students understood what was required and gained all 3 marks without much difficulty.

Question 4

The usual responses were seen in part (a): some simply saying a "discrete" distribution, some calling it an "equal" distribution and a few just giving a correct probability distribution table but no name. In part (b) most answered (i) correctly but usually by using the formula rather than symmetry. A few students are still dividing by n here so using a formula of the form $\frac{\sum x\mathrm{P}(X = x)}{n}$ In (ii) many could find Var(X) correctly but some still think E(X^2) = Var(X) and others forgot to square the 13 when subtracting. Part (c) was answered very well with few arithmetic slips but occasionally students misread their working and use E(X) instead of E(Y) when finding the variance. Part (d) proved to be more of a challenge: some confused X and Y and others did not know the formulae for E($aX + b$) and Var($aX + b$). Those with two correct equations were usually able to solve to find a and b. Those who had some values for a and b were usually able to find some values for W and occasionally we saw a suitable reason stated such as "no integer values of W" as well as a correct probability of zero.

Question 5

There were plenty of familiar demands in this question and many students answered the arithmetical parts of the question correctly. Most identified the correlation as positive in (a) and the calculations in (b) and (c) were carried out successfully. Many answered part (d) correctly too by either referring to the scatter diagram or their calculation in part (c). Part (e) was usually answered very well too. The interpretation requirement in part (f) caused problems though with many students failing to give a value for the increase in salary or failing to multiply the gradient of their line by 1000. In part (g) some students failed to draw their line across the full range from 9 to 50 but those who did were often able to secure at least one of the marks. Many students were unable to identify the manager who was underperforming in part (h) with (21, 20) being a common error but there was a good response to part (i) with most substituting $x = 30$ into their equation but many forgetting to multiply their answer by 1000 to give the salary.

Question 6

This was certainly the most challenging question on the paper and there were many blank answers here.

Most successful answers to part (a) were accompanied by a clear diagram showing the dimensions of a rectangle and the "winning area" inside. A common error was based on the observation that the area of the disc was $\pi \approx 3$ and simply dividing this by the area of the rectangle. Part (b) was answered quite well by those who attempted it but some still used an incorrect formula such as $\sqrt{295-\left(\frac{61}{15}\right)^2}$ and others with the correct formula for variance forgot to square root. A number misread the question here and counted the number of rolls rather than the number of students and an alternative mark scheme, applying the usual misread penalty, was used for parts (b) and (c) if this situation arose. In part (c) many were able to find the new mean correctly, but the standard deviation calculation was more difficult. A common error was a failure to square the standard deviation of 2 when finding $\sum y^2$ for the second group of 12 students but there were a reasonable number of correct answers seen.

Part (d) ideally required a clear diagram again and there were some excellent solutions seen with students clearly showing that they knew where the probability $\frac{\pi}{15}$ came from. As the final answer was not given here a slightly more generous mark scheme than in part (a) applied

and those who set this probability equal to the given 0.2216 could score some marks and many went on to find the appropriate estimate for π. Some students ignored the given context completely and simply stated that an approximate value for π was 3.142

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