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MATHEMATICS: STATISTICS (HALF CREDIT)

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Paper 0390/06

Paper 6

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General comments

This paper produced a wide range of marks. Many Centres however, entered candidates who had clearly not covered the syllabus and this was reflected in the performance of these candidates.

Most candidates answered questions to a suitable degree of accuracy, and it was pleasing to observe that only a few lost marks due to premature approximation.

Candidates seemed to have sufficient time to answer all the questions, and only the weaker ones answered questions out of order. Candidates from some Centres did not appear to know anything about the normal distribution. The use of clear diagrams in answering these questions would have helped many candidates to earn more marks, as many found the wrong area for the probability.

Comments on specific questions

Question 1

This question was well done by nearly everyone. There are still some Centres who do not teach candidates to use SD mode on their calculators, and so there were pages of working for the standard deviation when all that was required was a single number from their calculator. It is to be hoped that candidates realise that when only one mark is given, they are not expected to do pages of working. The second part was well answered, with many candidates having a good knowledge of the relationship between consistency and standard deviation.

Answers: **(i)** 139, 83.1; **(ii)** team B, smaller standard deviation.

Question 2

This question was a little unusual in that giving the data in the form of quartiles could have been represented by a box-plot. However, most candidates drew a credible cumulative frequency curve. A cumulative frequency polygon was also acceptable, as were percentage curves/polygons. However, some did not label their axes, and many chose inappropriate scales in order to fill the page completely. There were scales going up in, for example, 64 or 32 or 8 or 15. While the use of these scales was not penalised, these scales invariably meant that points were plotted wrongly and thus candidates did lose marks. Most candidates realised that the cumulative frequency values were 'less than' and so subtracted to find the number of people 'more than'.

Answer: **(ii)** Between 40 and 70 if a curve was drawn, or between 60 and 70 if a polygon was drawn.

Question 3

Unfortunately this question was completely misunderstood by a large number of candidates who gave a probability of $\frac{1}{6}$ for everything. Most knew what E(X) meant and were able to pick up a mark here, providing that their probabilities in part **(i)** were less than 1.

Answers: **(i)**

x	1	2	3	4	5	6
P($X = x$)	$\frac{11}{36}$	$\frac{9}{36}$	$\frac{7}{36}$	$\frac{5}{36}$	$\frac{3}{36}$	$\frac{1}{36}$

(ii) E(X) = $\frac{91}{36}$ = 2.53.

Question 4

The first part of this question was straightforward and most candidates who had covered the normal distribution performed well on it. Continuity corrections in this part gained no marks. The second part gave candidates an opportunity to show their understanding. It involved having to think through a small problem and plan how to solve it, and was well done by the good candidates.

Answers: **(i)** 0.203; **(ii)** 481.

Question 5

This question was the worst attempted on the whole paper. After the last two years' excellent permutation and combination solutions, it was disappointing to find that candidates felt obliged to put in some permutations, combinations or factorials where in fact straight multiplication of the options was all that was required. Very few candidates read the small print at the foot of the menu, about salad and either new potatoes or french fries, and thus missed a factor of 2. Part **(b)** was the best attempted part of this question.

Answers: **(a)(i)** 90, **(ii)** 69; **(b)** 252 252.

Question 6

A large majority of candidates gained full marks for this question, and most managed to draw a respectable tree diagram.

Answers: **(ii)** 0.247; **(iii)** $\dfrac{5}{19}$ = 0.263.

Question 7

This proved to be a good source of marks for those candidates who were familiar with the normal distribution and its approximation to the binomial. Some candidates thought that 'at most 2' meant 'exactly 2' or 'at least 2' and so lost a couple of marks. However, on the whole, this question was well done. In part **(iii)** the continuity correction was often used, although not always correctly. A surprising number of candidates failed to find the correct area in calculating the probability; a diagram would have helped.

Answers: **(i)** 0.398; **(ii)** 9; **(iii)** 0.972.