Leave blank

4. Luka wants to carry out a survey of students at his school.

He obtains a list of all 280 students.

(a) Explain how he can use this list to select a systematic sample of 40 students.

(2)

Luka is trying to make his own random number table. He generates 400 digits to put in his table. Figure 1 shows the frequency of each digit in his table.

Digit generated	0	1	2	3	4	5	6	7	8	9
Frequency	36	42	33	41	44	43	48	38	32	43

Figure 1

A test is carried out at the 10% level of significance to see if the digits Luka generates follow a uniform distribution.

For this test $\sum \frac{(O-E)^2}{E} = 5.9$

(b) Determine the conclusion of this test.

(3)

The digits generated by Luka are taken two at a time to form two-digit numbers.

Figure 2 shows the frequency of two-digit numbers in his table.

Two-digit numbers generated	00–19	20–39	40–59	60–79	80–99
Frequency	31	49	30	42	48

Figure 2

(c) Test, at the 10% level of significance, whether the two-digit numbers generated by Luka follow a uniform distribution. You should state the hypotheses, the degrees of freedom and the critical value used for this test.

(8)

There are 70 students in Year 12 at his school.

(d) State, giving a reason, the advice you would give to Luka regarding the use of his table of numbers for generating a simple random sample of 10 of the Year 12 students.

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Leave blank

Question 4 continued

Leave blank

Question 4 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Leave blank

Question 4 continued

Q4

(Total 15 marks)