Stats 2 Chi-Squared Contingency Table Tests Questions

2 Year 12 students at Newstatus School choose to participate in one of four sports during the Spring term.

The students' choices are summarised in the table.

	Squash	Badminton	Archery	Hockey	Total
Male	5	16	30	19	70
Female	4	20	33	53	110
Total	9	36	63	72	180

(a) Use a χ^2 test, at the 5% level of significance, to determine whether the choice of sport is independent of gender. *(10 marks)*

(b) Interpret your result in part (a) as it relates to students choosing hockey. *(2 marks)*

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4 It is claimed that the area within which a school is situated affects the age profile of the staff employed at that school. In order to investigate this claim, the age profiles of staff employed at two schools with similar academic achievements are compared.

Academia High School, situated in a rural community, employs 120 staff whilst Best Manor Grammar School, situated in an inner-city community, employs 80 staff.

The **percentage** of staff within each age group, for each school, is given in the table.

Age	Academia High School	Best Manor Grammar School
22–34	17.5	40.0
35–39	60.0	45.0
40–59	22.5	15.0

(a) (i) Form the data into a contingency table suitable for analysis using a χ^2 distribution. *(2 marks)*

(ii) Use a χ^2 test, at the 1% level of significance, to determine whether there is an association between the age profile of the staff employed and the area within which the school is situated. *(9 marks)*

(b) Interpret your result in part (a)(ii) as it relates to the 22–34 age group. *(2 marks)*

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7 A statistics unit is required to determine whether or not there is an association between students' performances in mathematics at Key Stage 3 and at GCE.

A survey of the results of 500 students showed the following information:

		GCE Grade				
		A	B	C	Below C	Total
Key Stage 3 Level	**8**	60	55	47	43	205
	7	55	32	31	26	144
	6	40	38	35	38	151
	Total	155	125	113	107	500

(a) Use a χ^2 test at the 10% level of significance to determine whether there is an association between students' performances in mathematics at Key Stage 3 and at GCE.
(9 marks)

(b) Comment on the number of students who gained a grade A at GCE having gained a level 7 at Key Stage 3.
(1 mark)

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1 Two groups of patients, suffering from the same medical condition, took part in a clinical trial of a new drug. One of the groups was given the drug whilst the other group was given a placebo, a drug that has no physical effect on their medical condition.

The table shows the number of patients in each group and whether or not their condition improved.

	Placebo	Drug
Condition improved	20	46
Condition did not improve	55	29

Conduct a χ^2 test, at the 5% level of significance, to determine whether the condition of the patients at the conclusion of the trial is associated with the treatment that they were given.
(10 marks)