

- 2 The manager of a car park claims that the number of cars entering the car park follows a Poisson distribution with mean 2.8. The numbers of cars entering the car park are recorded on a working day during successive 5-minute periods. The following table contains the observed frequencies, together with most of the expected frequencies and their contributions to the χ^2 -test statistic.

(a) Stating any assumptions you make, calculate a 95% confidence interval for θ . [5]

Number of cars	0	1	2	3	4	5	≥ 6
Observed frequency	2	15	31	29	13	3	7
Expected frequency	6.081	17.03	23.84	p	15.57	8.721	6.511
χ^2 -test statistic	2.739	0.241	2.152	q	0.425	3.753	0.037

- (b) Give a reason why the assumptions made in part (a) may not be appropriate in this case. [1]

- [5]

- $$f(x) = \begin{cases} \frac{1}{16}\sqrt{x} & 0 \leq x < 4, \\ \frac{1}{k\sqrt{x}} & 4 \leq x \leq 9, \\ 0 & \text{otherwise,} \end{cases}$$

[2]

- [3]

[5]

- 7 A discrete random variable X takes values $r = 0, 1, 2$ with probabilities $P(X=r)$ as given in the following table.

r	0	1	2
$P(X=r)$	a	$2a$	b

- (a) Write down the probability generating function of X , and use it to find an expression for $E(X)$ in terms of a and b . [2]

- (b) Show that $\text{Var}(X) = 2b + 2(a+b)(1-2a-2b)$. [3]

Additional page

- If you use the following page to complete the answer to any question, the question number must be clearly shown.

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