

- 2

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

- (a)**

[2]

[illegible]

- (b)

[4]

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[5]

③

5 A continuous random variable X has probability density function f given by

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

where k is a constant.

(a) Show that $k = 3$. [2]

(b) Find the median value of X . [3]

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The random variable Y is defined by $Y = \sqrt{X}$.

(c) Find the probability density function of Y .

[5]

5

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The random variable Y is defined by $Y = X_1 + X_2 + X_3 + \dots + X_{10}$ where $X_1, X_2, X_3, \dots, X_{10}$ are ten

- (c) Using the probability generating function of Y , and your answer to part (a), show that

[illegible]

- (d)** For the case $b = 0$, define fully the distribution of Y . [2]

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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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