

Assignment - 1

Date _____

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i a) Mean = $\frac{4 + 7 + 18 + 11 + 15 + 54 + 25}{10}$

= $\frac{134}{10} = 13.4$

ii a) Mean = $\frac{\sum f x}{\sum f} = \frac{0 + 11 + 52 + 45 + 12}{10} = \frac{120}{10} = 12$

i b) Median = $\frac{\frac{N}{2} + \frac{N}{2} + 1}{2} = \frac{11 + 16}{2} = 13.5$

ii b) Median =

X	f	cf
0	5	5
1	11	16
2	26	42
3	15	57
4	3	60

$\Rightarrow \frac{60}{2} = 30$

$\Rightarrow$ Median cf = 42

$\Rightarrow$ Median = 2

i c) Mode = 18

ii c) Mode = 2

$$i) \quad Q_1 = 2.5 = \frac{7+9}{2} = \frac{16}{2} = 8$$

$$Q_3 = 7.5 = 18$$

$$\Rightarrow IQR = Q_3 - Q_1 = 18 - 8 = 10$$

$$ii) \quad Q_1 = \frac{60+1}{4} = \frac{30.5}{1} = 15.25 = 1$$

$$Q_3 = 3 \left[15.25 \right] = 45.75 = 3$$

$$\Rightarrow IQR = 2$$

$$Q2) \quad P(X=1) = \frac{e^{-0.5} (0.5)^1}{1!} = \frac{1.64 \cdot 0.5}{0.606 - 0.5} = 1.64 \cdot 0.5 = 0.82$$

$$\Rightarrow P(\text{No claim occurs}) = 1 - 0.106 = 0.894$$

ask

ask

Q3 $\alpha = 2$ $\lambda = 1/2$ $0 < x < \infty$

i) $E(X) = \frac{\alpha}{\lambda} = \frac{2}{1/2} = \frac{2 \times 2}{1} = 4$

ii) $V(X) = \frac{\alpha}{\lambda^2} = \frac{2}{1/4} = 8$

$\Rightarrow \sigma = \sqrt{8} = 2.82$

Q4

$X \sim \text{Gam}(\alpha=2, \lambda=1/2) \Rightarrow 2\lambda X \sim \chi^2_{2\alpha}$

$\Rightarrow X \sim \chi^2_{4}$

$\Rightarrow P(X > 0) = P(\chi^2_{4} > 0)$
 $= 1 - P(\chi^2_{4} < 0)$
 $= 1 - 0.0000 = 1$

Q4.

~~A = GM FF~~ $A \rightarrow$ Qualified ~~person~~ ^{female} is selected

~~B = FF~~ $B \rightarrow$ Female is selected

~~A ∩ B =~~ $A \cap B \rightarrow$ Qualified female is selected

$\Rightarrow P\left[\frac{A}{B}\right] = \frac{7}{18} \div \frac{7}{8} = \frac{7}{18} \times \frac{8}{7} = \frac{4}{9}$

Q5 ask

Q7) $F(3) = ?$

ii) $EC(X) = \sum_{n=1}^5 n \cdot P(X=n)$

$$= \frac{1 \times 5}{100} + \frac{2 \times 15}{100} + \frac{3 \times 35}{100} + \frac{4 \times 40}{100} + \frac{5 \times 5}{100}$$

$$= \frac{5}{100} + \frac{30}{100} + \frac{105}{100} + \frac{160}{100} + \frac{25}{100}$$

$$= \frac{325}{100} = 3.25$$

Q8) $EC(X^2) = \sum_{n=1}^5 n^2 \cdot P(X=n)$

$$= \frac{1 \times 5}{100} + \frac{4 \times 15}{100} + \frac{9 \times 35}{100} + \frac{16 \times 40}{100} + \frac{25 \times 5}{100}$$

$$= \frac{5}{100} + \frac{60}{100} + \frac{315}{100} + \frac{640}{100} + \frac{125}{100}$$

$$= \frac{1145}{100} = 11.45$$

$$\Rightarrow V(X) = 11.45 - 10.5625 = 0.88$$

Q9> 1 ans

Q11> $P(M) = \frac{1}{2}$

$P(F) = \frac{1}{2}$

$P(\text{Herment 3 children are boys}) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

Q12 $X \sim \text{Poi}(10)$

$$\Rightarrow P(\text{Time b/w two claims is less than } 0.1 \text{ days})$$

$$= \frac{e^{-10} 10^{0.1}}{0.1!}$$

$$= \cancel{0.00005007} 0.00005$$

Q13 $X \sim U(75, 120)$

$80 < X < 100$

$\Rightarrow X \sim U(80, 100)$

$$\Rightarrow f_X(x) = \frac{1}{100 - 80} = \frac{1}{20} = 0.05$$

Q14 $X \sim \text{Gamma}(\underset{2}{\overset{\wedge}{5}}, 0.4)$

$P(X < 22.89)$

$\Rightarrow 2\lambda X \sim \chi^2_{V=2\alpha}$

$\Rightarrow 0.8X \sim \chi^2_{V=10}$

$$\Rightarrow P(X < 22.89) \Rightarrow \cancel{P(X < 22.89)} \cancel{P(0.8X < 18.288)} P(0.8X < 18.288)$$

$$\Rightarrow P(\chi^2_{10} < 18.288)$$

$$0.5 \rightarrow 0.9529 - 0.9450$$

$$1 \rightarrow \underline{0.9529 - 0.9450} \div 0.5$$

$$0.288 \rightarrow \frac{0.0079}{0.5} \times 0.288 = 0.0045$$

$$\Rightarrow P(\chi^2_{10} < 18.288) = 0.9495$$