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Killer Bees

Probability Assigonment

Q1 4, 7, 9, 9, 11, 15, 18, 18, 18, 25

Mean = ~~$\bar{x}$~~ $= \frac{4+7+9+9+11+15+18+18+18+25}{10}$

$\bar{x} = 13.4$

median $= \frac{\frac{n^{th}}{2} + \frac{n^{th}}{2} + 1}{2}$

$= \frac{11+15}{2} = 13$

mode $= 18$

IQR $= Q_3 - Q_1$

$Q_1 = 8 \quad Q_3 = 18$

2)

no of household	no of people
0	5
1	11
2	26
3	15
4	3

$\bar{x} = \frac{\Sigma fx}{\Sigma f} = \frac{0\times5 + 1\times11 + 2\times26 + 3\times15 + 4\times}{60}$

$= \frac{126}{60} = 2$

$P(A|L_1) = 0.2$ $P(A|L_3) = 0.1$

$P(A|L_2) = 0.4$

$$= \frac{0.5|0.4}{0.4 \times 0.2 + 0.5 \times 0.4 + 0.1 \times 0.1}$$

$$= \frac{0.2}{0.08 + 02 + 0.01}$$

$$= 0.68696$$

Q6. $X \sim N(1, 2)$

$$Y = \frac{3}{6 - x}$$

$$F_Y(y) = P(Y \leq y)$$

$$P\left(\frac{3}{6-x} \leq y\right)$$

$P(3 \leq y(6-x))$

$P(6 - x \geq 3y)$

$P(6 - x \geq 3y$

$P(x - 6 \leq 3y)$

$P(x \leq 6 - 3y$

Q9 So $P(x=7) = {}^{6}C_{2} (0.01)^{3} (0.99)^{4}$

$= 0.0600 \pm 4409$

Q10 $X \sim P(0.4)$

$P(x > 2) = 1 - P(x \leq 2)$

$= 1 - 0.99207$

$= 0.0793$

Median = n = 60

$\frac{\frac{n}{2} + \frac{n}{2} + 1}{2}$ → $\frac{30^{th} + 31}{2}$ = 30.5

Median = 2

IQR = ~~$Q_2 = 1$~~ $Q_1 = 1$

$Q_3 = 3$

IQR = $Q_3 - Q_1$

= 3 - 1 = 2

S.D

x	f	mean	$(x - \bar{x})^2$	$f(x - \bar{x})$
0	5	2	4	20
1	11	2	1	11
2	26	2	0	0
3	15	2	1	15
4	3	2	4	12

$S = \sqrt{\frac{\sum f(x - \bar{x})^2}{n - 1}}$ → $\sqrt{\frac{58}{59}}$ = 0.99149

Q7. F(3) = F(x ≤ 3)

=) 0.05 + 0.15 + 0.35

2) E(x) = 1(0.05) + 2(0.15) + 3(0.35) + 4(0.4) + 5(0.05)

=) 3.25

3) E(x²) = 1(0.05) + 4(0.15) + 9(0.35) + 16(0.4) + 25(0.05)

=) 11.45

$V(x) = E(x^2) - (E(x))^2$

=) $11.45 - (3.25)^2$

=) 0.8875

Coefficient of skewness = $E(x - \bar{x})^3$

Q8. $X \sim B(15, 0.2)$

$P(X < 3) = P(X = 0) + P(X = 1) + P(X = 2)$

$= {}^{15}C_0 (0.2)(0.8)^{15} + {}^{15}C_1 (0.2)^1 \times (0.8)^{14} + {}^{15}C_2 (0.2)^2 \times (0.8)^{13}$

= 0.39802

Q2. $P(x=0) \Rightarrow \frac{e^{-1} \lambda^{x}}{x!}$

$\Rightarrow \frac{e^{0.5} \cdot 1^{0}}{0!} = e^{-0.5} = 0.6065$

2. $4 \sim N$ Binomial $(3, 0.3935)$

$P(4=1) = {}^{3}C_{1} \times (0.3935)^{1} \times (0.6065)^{2}$

$\Rightarrow 0.434$

3. $x \sim exp(0.5)$

$P(x > 2) \int_{2}^{\infty} \lambda e^{-\lambda}$

$0.5 \int_{2}^{\infty} e^{-0.5x}$

$\Rightarrow \frac{e^{-0.5x}}{0.5} \times 0.5$

$= [e^{-0.5x}]_{2}^{\infty} \Rightarrow [e^{-x} - e^{-1}]$

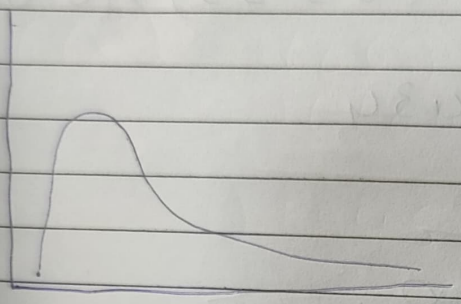
$= 0 - \frac{1}{e}$

$= \frac{1}{e} = 0.368$

Q3) i) $X \sim G(2, 1/2)$

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

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



It is positively skewed diagram it increase in the begining and then decreases

CDF:

$$\begin{cases} 0 & \\ \frac{1}{\alpha} x^{\alpha-1} \times e^{x/\beta} & \end{cases}$$

Q5 $P(L_1) = 0.4$ $P(L_2) = 0.5$ $P(L_3) = 0.1$

A :) Package allowing case

$P(L_2|A) = ?$