Assignment

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(4) th.

Total 18.
Male 10 (6 fully Qualified)
Female 8 (7 fully Qualified)

7/18

E → Random selected consists two qualified females.

F → Contains at least one female

⇒ 8/18

⇒ 7/18 Ans

7
8
8
18

(1) → (i) 4, 7, 9, 9, 11, 15, 18, 18, 18, 25

Sol.ⁿ

(a) Mean

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

⇒ 13.4

(b) Median

$n = 10 \Rightarrow \frac{n+1}{2} \Rightarrow 5.5$

(c) Mode = 2 = 18

d). $SD = \sqrt{\frac{(x - \bar{x})^2}{n}}$

$= \sqrt{\frac{(-2)^2 + (-1)^2 + 0^2 + (1)^2 + (2)^2}{60}}$

$SD = \sqrt{\frac{1}{6}}$

$SD = 0.4082 = 6.$

Interquartile range $Q_3 - Q_1$

$Q_3 = 3\left(\frac{n+1}{4}\right)^{th}$ term

$3\left(\frac{10+1}{4}\right)$

$= 3\left(\frac{11}{4}\right)$

$= \frac{33}{4} = 8.25^{th}$

$= 18.25$

$Q_1 = \frac{n+1}{4}^{th}$ term

$= \frac{11}{4}$

$= 2.75^{th}$ term

$= 8.5$

$18.25 - 8.5 = 9.75$

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(3)

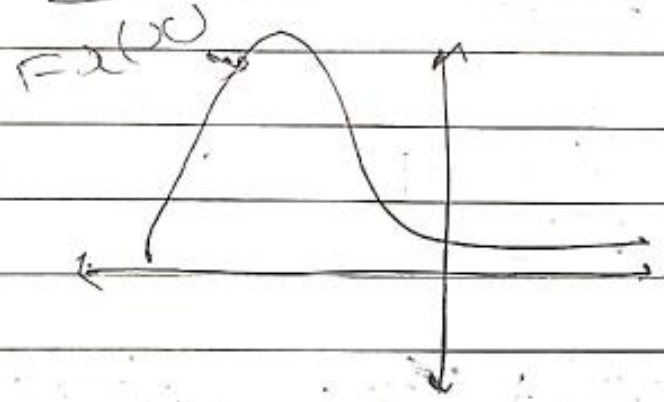
(i). $\bar{x} = 2\lambda$

$\bar{x} = 4$

$2\bar{x} = 8 = V(x)$

$SD = 2.8284$

(ii)



(iii) $f_x(x) \Rightarrow x \sim Gramma(2, 1/2)$

$2\lambda x \sim \chi^2$

$F_x(x) = P(0 < \lambda x^2 < \infty)$

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(7)

i) $F(3) = P(x \leq 3)$

$= P(x=1) + P(x=2) + P(x=3)$

$= 0.05 + 0.15 + 0.35$

$\boxed{F(3) = 0.55}$

ii) $E(x) = \sum_{i=1}^{5} x \cdot P(x=x)$

$= (1 \times 0.05) + (2 \times 0.15) + (3 \times 0.35) + (4 \times 0.4) + (5 \times 0.05)$

$= 0.05 + 0.3 + 1.05 + 1.6 + 0.25$

$\boxed{E(x) = 3.25}$

(8) $p = 0.2$

$q = 0.8$

let A be event the probablity that the 3 of them exceed 1000.

$P(A) = {}^{15}C_0 p^0 q^{15} + {}^{15}C_1 p^1 q^{14} + {}^{15}C_2 p^2$

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$= 1 - [(0.2)^9(0.8)^{15} + 15(0.2)(0.8)^{14} + 105(0.2)^2(0.8)^{13}]$

$= 0.0352 + 0.1319 + 0.2388$

$P(A) = 0.3979$

$P(A) \geq 0.4$ Ans

Thus, probability that less than 3 exceed 1000 is 0.4

(9) $p = 0.01$

$q = 0.99$

$P(X=3) = {}^6C_2 p^2 q^4$

$\frac{6!}{2!4!} \times (0.01)^2 \times (0.99)^4$

$P(X=3) \Rightarrow \boxed{0.000001441}$

$\Rightarrow$ Ans.

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(11.) Probablity of having male child is 1/2

Woman has 5 boys & two girls next 3 boys probability?

⇒ Irrespective of previous children every child has probablity of 1/2 for a boy

So next 3 boys.

$1/2 \times 1/2 \times 1/2 \Rightarrow \boxed{1/8}$

There is 1/8 probablity that ~~those~~ ~~child~~ next three children will be boys.

(5.) Bayes theorem:

$$P(E_2/V) = \frac{P(E_2) \times P(V/E)}{P(V)}$$

$$\Rightarrow \frac{\frac{50}{100} \times \frac{40}{100}}{\frac{40}{100} \times \frac{20}{100} + \frac{50}{100} \times \frac{40}{100} + \frac{10}{100} \times \frac{10}{100}}$$

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$$= \frac{\frac{1}{5}}{\frac{2}{25} + \frac{1}{5} + \frac{1}{100}} = \frac{\frac{1}{5}}{\frac{29}{100}}$$

$$= \frac{100}{145} \Rightarrow \boxed{\frac{20}{29}}$$ Ans //