Assignment

1. i) $\frac{11+15}{2} = \frac{26}{2} = 13$, $Q_2 = 13$

$Q_1 = \{4, 7, 9, 9, 11\}$, median = 9

$Q_3 = \{15, 18, 18, 18, 25\}$, median = 18

Inter quartile range = $Q_3 - Q_1 = 18 - 9 = 9$

3

i) $f_X(x) = \dfrac{\lambda^\alpha e^{-\lambda x} x^{\alpha-1}}{\Gamma(\alpha)}$ $\quad \alpha = 2, \lambda = \dfrac{1}{2}$

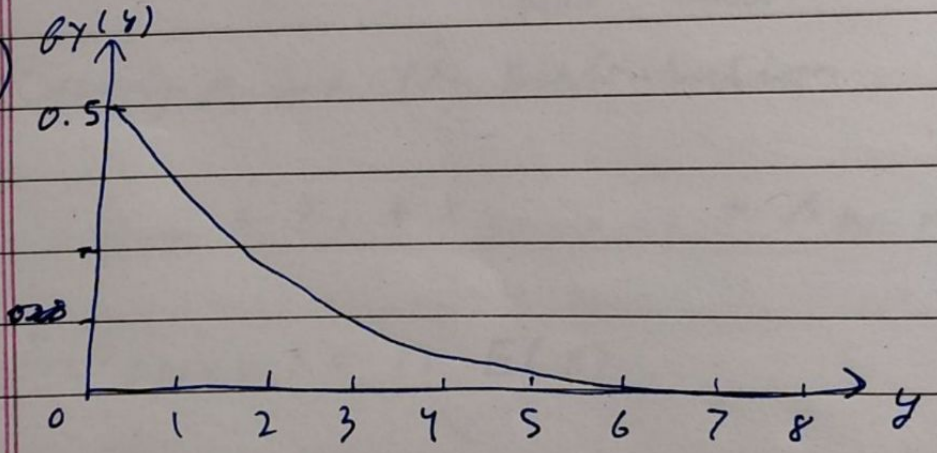
$= \dfrac{\left(\frac{1}{2}\right)^2 e^{-\frac{1}{2}x} x^{2-1}}{(2-1)!}$

$= \dfrac{\frac{1}{4} e^{-1} x^1}{1} = \pm 0.67957x$

$E(X) = \dfrac{\alpha}{\lambda} = 2 \div \dfrac{1}{2} = 2 \times 2 = 4$

ii) $STD = \sqrt{\dfrac{\alpha}{\lambda^2}} = \dfrac{\sqrt{\alpha}}{\lambda} = \dfrac{\sqrt{2}}{\frac{1}{2}} = 2\sqrt{2}$

(i)



(iii) $x \sim$ Gamma $(2, \frac{1}{2})$

P

4. $M = 10$, $F = 8$, $qM = 6$, $qF = 7$

$10 \rightarrow 6$, 4

$8 \rightarrow 7$, 1

$^{7}C_1 \times {}^{1}C_1 = \frac{7!}{6!1!} = 7 \times 1 = 7$ ways

5. $100 \xrightarrow{1} 40 \xrightarrow{L} 20$ of $40 = 8$

$\xrightarrow{2}$ 50 — $40\% = 20$

$\xrightarrow{3}$ 10 — $10\% = 1$

$P(*\bar{2}) = \frac{50}{100} \times \frac{40}{100} * = \frac{2}{10} = \frac{1}{5}$, $P = \frac{20}{50} = \frac{2}{5}$

6. $X \sim U(1,2)$, $Y = \frac{3}{6-X}$

$Y = \frac{3}{6-1} = \frac{3}{5}$, $Y = \frac{3}{6-2} = \frac{3}{4}$

$\theta_Y(4) = \frac{1}{\frac{3}{5} - \frac{3}{4}} = \frac{1}{\frac{3}{20}} = \frac{20}{3}$