Assignment 5

Q7. $\begin{cases} \mu = 24 \\ \sigma^2 = 144 \end{cases} \Rightarrow \begin{cases} \alpha\beta = 24 \\ \alpha\beta^2 = 144 \end{cases} \Rightarrow \begin{cases} \alpha = 4 \\ \beta = 6 \end{cases}$

$X \sim \text{Gamma}(4, 6)$.

(a) $P(12 \le X \le 24)$

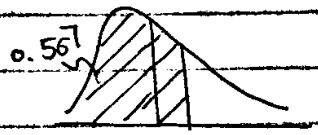
$= F(24; 4, 6) - F(12; 4, 6)$

$= F(4; 4) - F(2; 4)$

$P(X \le x) = F(x; \alpha, \beta) = F(\frac{x}{\beta}; \alpha)$

∴ Look at table A4

(b) $P(X \le 24) = F(4; 4) = 0.56$.



∴ Median is less than Mean 24.

(c) $F(\frac{x}{\beta}; \alpha) = F(\frac{x}{6}; 4) = 0.99$.

(d). We want a value t for $P(X > t) = 0.005$

$\Rightarrow P(X \le t) = 1 - P(X > t) = 0.995$

$\therefore F(\frac{t}{6}; 4) = 0.995$

$\Rightarrow$ In table A4, $F(11; 4) = 0.995$

$\Rightarrow t = 11(6) = 66$