Recitation 5 Answers

1.

(a) i. $E(x) = 13/6$
ii. $Prob(A) = 5/8$
iii. $E(x|A) = 38/15$

(b) $E(w) = 5 \qquad VAR(w) = 16/3$

2. (a) $\frac{1}{\lambda}$ and $\frac{1}{e}$

(b) Let $Y = X - t$, then

$$f_Y(y) = \begin{cases} \lambda \cdot e^{-\lambda \cdot y} & , \quad y \geq 0 \\ 0 & , \quad \text{otherwise} \end{cases}$$

3.

(a) No.

(b) $f_X(x) = \begin{cases} \frac{1}{\pi r^2}(2\sqrt{r^2 - x^2}), & -r \leq x \leq r \\ 0, & \text{otherwise} \end{cases}$

(c) $f_{X|Y}(x|\sqrt{3}r/2) = \begin{cases} 1/r, & -1/2r \leq x \leq 1/2r \\ 0, & \text{otherwise} \end{cases}$

$E[X|Y = \sqrt{3}r/2] = 0$

(d) $f_{X,Y|A}(x, y|A) = \begin{cases} \frac{4}{\pi r^2}, & 0 \leq x^2 + y^2 \leq (\frac{r}{2})^2 \\ 0, & \text{otherwise} \end{cases}$