1. a) $E(Y) = \int_0^\infty y\, f(y)\, dy$

$$= \int_0^\infty y \cdot 2\lambda\pi y \exp(-\lambda\pi y^2)\, dy.$$

b) Since $\delta = \gamma_0$, $\quad Y$: truncated r.v., $Y \geq \gamma_0$

$$P[Y \leq y \mid Y > \gamma_0] = \frac{P[\gamma_0 < Y \leq y]}{P[Y > \gamma_0]}$$

$$f(y) = \frac{d}{dy} P[Y \leq y \mid Y > \gamma_0]$$

c) $E[Y] = \int_0^{\gamma_0} y_0 \times 0\, dy + \int_{\gamma_0}^\infty y \cdot 2\lambda\pi y \times \exp[-\lambda\pi(y^2 - \gamma_0^2)]\, dy$

$$E[Y^2] = \exp(\lambda\pi\gamma_0^2) \int_{\gamma_0}^\infty y^2\, 2\lambda\pi y \exp[-\lambda\pi y^2]\, dy.$$

$$Var[Y] = E[Y^2] - (E[Y])^2$$

$Y_1 \cdots Y_N$: nearest neighbor distances

under CSR,

$$G(y) = P(Y \leq y) = 1 - P(Y > y)$$

$= 1 - P($No other events in a circle of radius $y)$

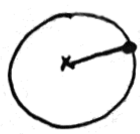
$$= 1 - \frac{(\lambda\pi y^2)^0 e^{-\lambda\pi y^2}}{0!}$$

$$= 1 - e^{-\lambda\pi y^2}$$

$\pi Y^2 \sim \exp(\lambda)$

$\Rightarrow 2\pi\lambda Y^2 \sim \chi^2_2$

$\Rightarrow 2\pi\lambda \sum_{i=1}^{m} Y_i^2 \sim \chi^2_{2m}$



$$f(y) = 2\lambda\pi y \cdot \exp(-\lambda\pi y^2), \; y > 0.$$