SEC-3

(1)

i) $f(x) \geq 0$ for ~~every~~ x in $(1,2)$ and.

$$\int_{-\infty}^{\infty} f(x)\,dx = \int_{-\infty}^{0} 0\,dx + \int_{0}^{\infty} e^{-x}\,dx = 1$$

Hence the function $f(x)$ satisfies the requirement for a density function.

ii) Required probability

$$= P(1 \leq x \leq 2) = \int_{1}^{2} e^{-x}\,dx$$

$$= e^{-1} - e^{-2}$$

$$= 0.368 - 0.135 = 0.233$$

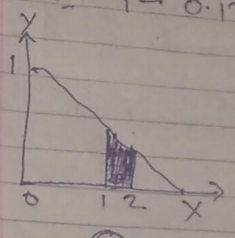
This probability is equal to the shaded area.

iii) Commulative probability function $P(2)$:

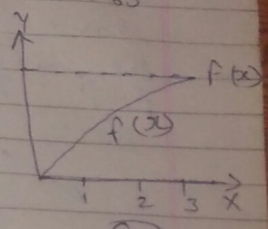
$$\int_{-\infty}^{2} f(x)\,dx$$

$$= \int_{-\infty}^{0} 0\,dx + \int_{-\infty}^{2} e^{x}\,dx = 1 - e^{-2}$$

$$= 1 - 0.135 = 0.865$$



(i)



(ii)