Ans to the Q: NO: (1)

Find the Probability that the devices less then 2 years

$$P(0 \le x \le 2)$$

$$= F(2) - F(0)$$

$$= F(2) = \frac{1}{2} \int_0^2 e^{-2/2} \, dt$$

$$= 0.6796$$

Probability lats between 2 and 3 years

$$P(2 \le X \le 3)$$

$$F(3) - F(2)$$

$$= \left(\frac{1}{2} \int_2^3 e^{-3/2} dt \right) - \left(\frac{1}{2} \int_2^3 e^{-2/2} dt \right)$$

$$= 2.241 - 1.359$$

$$= 0.882$$

the mean of life of the Penerlaus device is

$$E(x) = \frac{1}{2}\int_0^x x e^{-x/2}\,dx = -x e^{-x/2}\Big|_0^\infty + \int_0^\infty e^{-1/2}\,dt = 2$$

To compute variance of x, we first compute $E(x^2)$:

$$E(x^2) = \frac{1}{2}\int_0^\infty x^2 e^{-x/2}\,dx = -x^2 e^{-x/2}\Big|_0^\infty + \int_0^\infty e^{-x/2}\,dx = 8$$

Hence, the variance and standard deviation of device life

$$v(x) = 8 - 2^2 = 4$$

$$\sigma = \sqrt{v(x)} = 2$$