

Continuous Probability Distributions

Q1

$$\mu = 10$$

$$\text{Variance} = \sigma^2 = 4$$

$$\sigma = \sqrt{4} = 2$$

$$\Phi(a') = \Phi\left(\frac{a-10}{2}\right) = 0.05$$

$$\Phi(b') = \Phi\left(\frac{b-10}{2}\right) = 0.95$$

$$b' = \frac{b-10}{2} = 1.65 \quad \rightarrow \quad \therefore a = 6.7$$

$$a' = \frac{a-10}{2} = -1.65 \quad \rightarrow \quad \therefore b = 13.3$$

Q3

$$\lambda = 0.4$$

a) Probability that satellite being alive after 5 years is given by :

$$\begin{aligned} P(X > 5) &= 1 - F(5) \\ &= 1 - (1 - e^{-\lambda x}) \\ &= e^{-\lambda x} \\ &= e^{-0.4 \times 5} \\ &\approx 0.13533 \end{aligned}$$

b) Probability that the satellite dies between 3 and 6 years :

$$\begin{aligned} F(6) - F(3) &= (1 - e^{-0.4 \times 6}) - (1 - e^{-0.4 \times 3}) \\ &\approx 0.21048 \end{aligned}$$