

STA 237, TUT 3 Answers

①

Q2]

$$n = 20$$

$$p = P(\text{survive}) = 1 - 0.2 = 0.8$$

let X be the number of survive

$$X \sim \text{Bin}(20, 0.8)$$

$$(a) P(X = 14)$$

$$= P(X \leq 14) - P(X \leq 13)$$

$$= 0.196 - 0.087$$

$$= 0.109$$

$$(b) P(X \geq 10)$$

$$= 1 - P(X \leq 9)$$

$$= 1 - 0.001$$

$$= 0.999$$

$$(c) P(X \leq 16)$$

$$= 0.589$$

$$(d) E(X) = np = 20 \times 0.8 = 16$$

$$V(X) = np(1-p) = 20 \times 0.8 \times 0.2 = 3.2$$

Q3] let γ be the number of arrivals

$$\gamma \sim \text{Poi}(7)$$

$$\begin{aligned} \text{(a)} \quad & P(\gamma \leq 3) \\ &= 0.982 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & P(\gamma \geq 2) \\ &= 1 - P(\gamma \leq 1) \\ &= 1 - 0.007 \\ &= 0.993 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & P(\gamma = 5) \\ &= P(\gamma \leq 5) - P(\gamma \leq 4) \\ &= 0.391 - 0.173 \\ &= 0.218 // \end{aligned}$$