

Name: _____

PID: _____

Do not open this exam until instructed to do so. Please simplify your answers to the extent reasonable without a calculator. Show your work. Explain your answers, concisely. Write your name at the top of each page in the space provided.

Question	Points
1	25
2	25
3	25
4	25
Total:	100

RANDOM VARIABLES

$$B \sim \text{Ber}(p) \quad P(B = b) = \begin{cases} 1 - p & \text{if } b = 0; \\ p & \text{if } b = 1. \end{cases}$$

$$K \sim \text{Bin}(n, p) \quad P(K = k) = \binom{n}{k} p^k (1 - p)^{n-k}, \quad k \in \{0, 1, \dots, n\}.$$

$$K \sim \text{Geom}(p) \quad P(K = k) = (1 - p)^{k-1} p, \quad 0 < k \in \mathbb{Z}.$$

$$K \sim \text{Poisson}(\lambda) \quad P(K = k) = \frac{\lambda^k}{k!} e^{-\lambda}, \quad 0 \leq k \in \mathbb{Z}.$$

$$X \sim \text{Unif}[a, b] \quad f(x) = \frac{1}{b - a}, \quad x \in [a, b].$$

$$X \sim \mathcal{N}(\mu, \sigma^2) \quad f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/(2\sigma^2)}, \quad x \in \mathbb{R}.$$

$$T \sim \text{Exp}(\lambda) \quad f(t) = \lambda e^{-\lambda t}, \quad 0 \leq t \in \mathbb{R}.$$

$$T \sim \text{Gamma}(r, \lambda) \quad f(t) = \frac{\lambda^r t^{r-1}}{\Gamma(r)} e^{-\lambda t}, \quad 0 \leq t \in \mathbb{R}.$$