

Section #3 Warmup

Based on the work of many CS109 staffs

1 Lecture 8, 4-22-20: Poisson and More

- (a) Cite the probability mass function for the Negative Binomial distribution, $X \sim \text{NegBin}(r, p)$. Recall this is the number of independent flips up to and including the r^{th} head, when $P(\text{head}) = p$.
- (b) Recall the PMF for $Y \sim \text{Poi}(\lambda)$: $p_Y(k) = e^{-\lambda} \lambda^k / k!$ for k in the range of Y . If $Z \sim \text{Poi}(2.3)$, then $P(Z = 2.3) = ?$
2. How many emails will I expect to receive in the next seven minutes if on average I receive w per minute?

2 Lecture 9, 4-24-20: Continuous Random Variables

1. True or False.

- If X is a continuous RV, then $0 \leq f_X(x) \leq 1$ for all $x \in \mathbb{R}$. Recall f_X denotes the PDF of X .
- If X is a continuous RV, then $0 \leq F_X(x) \leq 1$ for all $x \in \mathbb{R}$. Recall F_X denotes the CDF of X .

2. Short Answer. Let $X \sim \text{Uni}(\alpha, \beta) = \text{Uni}(12, 17)$

- $P(X < 13) = ?$
- $P(X \leq 13) = ?$
- $P(X = 13) = ?$

3 Lecture 10, 4-27-20: The Normal Distribution

True or False. Let $X \sim \mathcal{N}(\mu, \sigma^2)$.

- $(X - \mu) / \sigma \sim \mathcal{N}(0, 1)$.
- For all $w \in \mathbb{R}$, $P(X < \mu - w) = P(X > \mu + w)$
- $\text{Mean}(X) = \text{Median}(X) = \text{Mode}(X) = \mu$
- $f_X(\mu) = 1$
- $F_X(\mu) = 0.5$