

Recitation 8
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1. Let Z be a continuous random variable with probability density function

$$f_z(z) = \begin{cases} \gamma(1 + z^2), & \text{if } -2 < z < 1, \\ 0, & \text{otherwise.} \end{cases}$$

- (a) For what value of γ is this possible?
(b) Find the cumulative distribution function of Z .

2. Problem 3.9, pages 186–187 in the text.

The taxi stand and the bus stop near Al's home are in the same location. Al goes there at a given time and if a taxi is waiting, (this happens with probability $2/3$) he boards it. Otherwise he waits for a taxi or a bus to come, whichever comes first. The next taxi will arrive in a time that is uniformly distributed between 0 and 10 minutes, while the next bus will arrive in exactly 5 minutes. Find the CDF and the expected value of Al's waiting time.

3. Let λ be a positive number. The continuous random variable X is called **exponential** with parameter λ when its probability density function is

$$f_X(x) = \begin{cases} \lambda e^{-\lambda x}, & \text{if } x \geq 0, \\ 0, & \text{otherwise.} \end{cases}$$

- (a) Find the cumulative distribution function (CDF) of X .
(b) Find the mean of X .
(c) Find the variance of X .
(d) Suppose X_1 , X_2 , and X_3 are independent exponential random variables, each with parameter λ . Find the PDF of $Z = \max\{X_1, X_2, X_3\}$.
(e) Find the PDF of $W = \min\{X_1, X_2\}$.

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