Stat 134: Section 12

Brett Kolesnik

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

a. What is the relationship between $f(x)$ and $P(X \in dx)$

b. Write down the formula for $P(a \leq x \leq b)$, where X is a continuous R.V.

c. How do we calculate $\mathbb{E}(X)$ and $Var(X)$ if X is continuous?

Problem 1

Suppose X has density $f(x) = c/x^4$ for $x > 1$, $f(x) = 0$ otherwise, where c is a constant. Find

a. c;

b. $\mathbb{E}(X)$;

c. $Var(X)$.

Problem 2

Suppose that X is a random variable whose density is

$$f(x) = \frac{1}{2(1+|x|)^2}, (-\infty < x < \infty)$$

a. Find $P(-1 < X < 2)$

b. Find $P(|X| > 1)$

c. Is $\mathbb{E}(X)$ defined?

Problem 3

Suppose X is a random variable whose density $f(x) = cx(1-x)$ for $0 < x < 1$, and $f(x) = 0$ otherwise. Find:

a. c;

b. $P(X = 1/2)$;

c. $P(X < 1/2$;

d. $Var(X)$.