

Mean, Mode, Variance, Standard Deviation

1. Find the mean and the variance of the random variables with the following PDFs.

(a) $f(t) = 1$ for $0 \leq t \leq 1$ and $f(t) = 0$ otherwise.

(b) $f(x) = \frac{2}{x^3}$ for $1 \leq x \leq \infty$ and $f(x) = 0$ otherwise.

(c) $f(t) = 3t^2$ for $0 \leq t \leq 1$ and $f(t) = 0$ otherwise.

(d) $f(x) = \frac{1}{2}e^{-|x|}$ for $x \in \mathbb{R}$.

2. What is the mode of the random variable with PDF

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

3. What is the standard deviation of the random variable with PDF $2e^{-2t}$.

4. What is the standard deviation of the random variable with PDF $\frac{1}{2}e^{-|x|}$?