Homework 5

- Due by 2025.05.07 9:11AM
- Answers without due explanation/reasoning will not be graded.
- 1. Determine the CDF of Z with PDF

$$f_Z(x) = \frac{1}{\pi(1+x^2)}$$

- 2. Let $U, V \sim \text{Uni}(0, 1)$ be independent. Find $\mathbf{E} |V U|$.
- 3. Let S be a continuous random variable with CDF

$$F_S(x) = \frac{1}{1 + e^{-x}}$$

Describe how one can obtain samples of S based on samples of $U \sim \text{Uni}(0, 1)$.

- 4. Compute $\mathbf{E}X^2$ and $\mathbf{E}X^3$ where $X \sim \mathrm{Exp}(1)$.
- 5. Suppose $Y \sim \text{Exp}(\lambda)$. For t, s > 0, find the conditional probability

$$P(Y > t + s \mid Y > t)$$