

39. Consider the function

$$F_X(x) = \frac{1}{1 + e^{-x}}, \quad x \in \mathbb{R}.$$

- (a) Prove $F_X(x)$ is a cumulative distribution function (CDF).
- (b) Use $F_X(x)$ to find the probability density function (PDF).
- (c) Find a monotone transformation $g(x)$ such that the random variable $U = g(X)$ has a uniform distribution on the interval $(0, 1)$.