

1. A random variable X has the following pdf

$$f(x) = \frac{\exp(-|x|)}{2} \quad \text{any real } x$$

(this is the so called Laplace or double exponential distribution). Find the distribution function of $Y = X^2$, the corresponding pdf and its support.

2. X is a random variable with the following pdf:

$$f(x) = c \cdot (1 + x^2) \quad -1 < x < 1$$

where c is an appropriate constant (to be established first). Find the distribution function of $Y = \exp(-|X|)$, the corresponding pdf and its support.

3. If X has Exponential distribution with $\beta = 2$, find the pdf of $Y = \frac{1}{X}$ and its support. What is the median of Y and how does it relate to the median of X ?
4. Assume that X has Exponential distribution with $\beta = 1$. Find and *identify* the distribution of $Y = \exp(-X)$.
5. X has Cauchy distribution with the median equal to 0 and the quartile deviation of 1. Find and identify the distribution of $Y = \frac{1}{X}$. Hint: the transformation is one-to-one, so use the pdf technique.