Homework 2

1. Suppose that $f_X(x;p) = \frac{-(1-p)^x}{x \cdot logp}$ for $x = 1, 2, ...$ and for some parameter $p \in (0, 1)$. Find the mean and variance of X in terms of p.

2. Casella & Berger problems 3.1 and 3.2

3. Suppose $f_X(x) = \frac{1}{\sqrt{2\pi}} exp\left\{\frac{-(x-10)^2}{2}\right\}$. ($X$ is normally distributed with mean 10 and variance 1.)

   (a) What is the distribution of $Y = |X|$?

   (b) What is the distribution of $Z = X^4$?

4. A density function often used by engineers is the Rayleigh density, given by $f_X(X) = \frac{2x}{\theta} exp(-\frac{x^2}{\theta})$, $x > 0$. What is the distribution of $Y = X^2$?