Homework Assignment No. 2
Due 2:00pm, April 19, 2019

Reading: Random Variables.
Problems for Solution:

1. (20%) Let X be a nonnegative discrete random variable with the distribution function F. Show that
$$E(X) = \sum_{t \geq 0} [1 - F(t)] .$$

2. (20%) We known that
$$p(x) = \frac{6}{(\pi x)^2}, \quad \text{for } x = 1, 2, 3, \ldots$$
is the probability mass function of a random variable X. Find
$$\sum_{x=1}^{\infty} \frac{1}{x^2} = ?$$

3. (20%) Suppose that X is a discrete random variable with $E(X) = 1$ and $E[X(X - 1) + 1] = 4$. Find $\mathrm{Var}(3X + 20190412)$.

4. (20%) Let X be a random integer from the set $\{1, 2, \ldots, N\}$. Find $E(X)$ and $\mathrm{Var}(X)$.

5. (20%) A box contains 15 fuses, of which 5 are defective. What is the expected number of defective items among 2 fuses selected randomly?