1. The probability distribution of a discrete random variable X is given by

$$\mathbb{P}(x = -1) = \frac{1}{5}, \qquad \mathbb{P}(x = 0) = \frac{2}{5}, \qquad \mathbb{P}(x = 1) = \frac{2}{5}$$

   (a) Compute $\mathbb{E}(X)$.

   (b) Give the probability distribution of $Y = X^2$ and compute $\mathbb{E}(Y)$ using the distribution of Y.

   (c) Determine $\text{Var}(X)$ and $\text{Var}(Y)$.

2. Find a) $\mathbb{E}(X)$, b) $\mathbb{E}(X^2)$, c) $\mathbb{E}(X - \mu)^2$ for the following probability distribution

$$\mathbb{P}(x = 8) = \frac{1}{8}, \quad \mathbb{P}(x = 12) = \frac{1}{6}, \quad \mathbb{P}(x = 16) = \frac{3}{8} \quad \mathbb{P}(x = 20) = \frac{1}{4} \quad \mathbb{P}(x = 24) = \frac{1}{2}$$

3. For a certain random variable with $\mathbb{E}(X) = 2$, $\text{Var}(X) = 4$. Compute the expectation the exceptation and variance of $3 - 2X$.

4. If a man purchases a raffle ticket, he can win a first prize of €5000 or a second prize of €2000 with probabilities 0.001 and 0.003. What should be a fair price to pay for the ticket?.