

MATH 134A Review: Expectation and Variance

1. Let X be a random variable that takes value 1 with 100% probability. What is the expectation of X ? What is the variance of X ?

Solution:

$$\mathbb{E}(X) = 1 = \mu \quad \mathbb{E}((X - \mu)^2) = 0.$$

2. Let X be a random variable that takes value -1 with 50% probability and value $+1$ with 50% probability. What is the expectation of X ? What is the variance of X ?

Solution:

$$\mathbb{E}(X) = 0 = \mu \quad \mathbb{E}((X - \mu)^2) = 1.$$

3. Let X be a random variable that takes value 0 with 99% probability and value 100 with 1% probability. What is the expectation of X ? What is the variance of X ? Hint $(99)^2 = (100 - 1)^2 = 10000 - 200 + 1 = 9801$.

Solution:

$$\mathbb{E}(X) = 1 = \mu \quad \mathbb{E}((X - \mu)^2) = .99 + 98.01 = 99.$$