

## Properties of Variance

### Exercise 1. Some calculations for the variance

Let  $X$  be a random variable with expectation  $\mu$  and standard deviation  $\sigma(X)$ . Consider the transformation  $Y = aX + b$  where  $a, b$  are constant real numbers.

1. Show that the expectation  $Y$  is given by  $\mathbb{E}(Y) = a\mu + b$
2. Show that the standard deviation of  $Y$  is given by  $\sigma(Y) = |a|\sigma(X)$ .

### Exercise 2. Example for a discrete random variable

A discrete random variable  $X$  has the following distribution given by a probability mass function:

$$\begin{array}{r} k = \quad 1 \quad 2 \quad 3 \\ \hline p_k = 0.2 \quad 0.3 \quad 0.5 \end{array}$$

Find the variance and standard deviation of  $X$ .