

## Exercise 1:

$$\text{Success rate} = \pi = 10\%, n = 5$$

Let  $X$  denote the number of games that the Gorokovs won in the first five games.

$$(a) X \sim \text{Bin}(5, 0.1)$$

In general:

$$\begin{aligned} (b) P(X=4) &= \binom{5}{4} 0.1^4 (1-0.1)^{5-4} \\ &= 5 (0.1)^4 (0.9)^1 \\ &= 36\% \end{aligned}$$

$$X \sim \text{Bin}(n, \pi)$$

$$P(X=k) = \binom{n}{k} \pi^k (1-\pi)^{n-k}$$

$$(c) E(X) = 5 \cdot 0.1 = 0.5$$

$$\begin{aligned} (d) \text{Var}(X) &= 5 \cdot 0.1 \cdot (1-0.1) \\ &= 5 \cdot 0.1 \cdot 0.9 \\ &= 0.45 \end{aligned}$$

Requirements for Binomial Distribution

1. Counting number of wins.

2. Probability of winning constant

$$(a) Y \sim \text{Bin}(3, 0.46)$$

$$(b) P(Y=2) = \binom{3}{2} 0.46^2 (1-0.46)^{3-2}$$

## Exercise 2:

$$= 3 (0.46)^2 (0.54)$$
$$= 34.3\%$$

3- Empfehlungen  
Grenzen

C)  $E(x) = 1(0.46) = 1.38$

D)  $SD(x) = \sqrt{3(0.46)(1-0.46)} = 0.863$