1. Erwartungswert und Standardabweichung für diskrete Zufallsvariablen

$$
\begin{aligned}
E(X) = \mu &= x_1p_1 + x_2p_2 + ... + x_np_n \\
Var(X) &= \sum (x_i - E(X))^2 \cdot P(X = x_i) \\
Var(X) &= \sum (x_i - \mu)^2 \cdot P(X = x_i) \\
Var(X) &= \sum (x_i - \mu)^2 \cdot f(x_i) \\
\Rightarrow \sigma &= \sqrt{Var(X)} \\
\sigma^2 &= \frac{(x_1 - \mu)^2 + (x_2 - \mu)^2 + ... + (x_n - \mu)^2}{n} \\
\sigma &= \sqrt{\frac{(x_1 - \mu)^2 + (x_2 - \mu)^2 + ... + (x_n - \mu)^2}{n}}
\end{aligned}
$$

2. Würfel-Experiment

$$
\begin{aligned}
M &= \{1; 2; 3; 4; 5; 6\} \\
p &= \frac{1}{6} \\
\mu &= 1 \cdot \frac{1}{6} + 2 \cdot \frac{1}{6} + 3 \cdot \frac{1}{6} + 4 \cdot \frac{1}{6} + 5 \cdot \frac{1}{6} + 6 \cdot \frac{1}{6} \\
&= \frac{21}{6} \\
\sigma &= \sqrt{\frac{(1 - \frac{21}{6})^2 + ... + (6 - \frac{21}{6})^2}{6}} \\
\sigma &= \frac{\sqrt{105}}{6} = 1.707
\end{aligned}
$$