# 1. Allgemeine Form

$$
\begin{aligned}
n = 10, p = 0.2 \\
P(X = 3) &= B_{10;0.2}(3) \\
P(X \leq 3) &= F_{10;0.2}(3) \\
P(X > 1) &= F_{10;0.2}(10) - F_{10;0.2}(2) \\
P(5 \leq x \leq 8) &= F_{10;0.2}(8) - F_{10;0.2}(5)
\end{aligned}
$$

# 2. S. 289 Nr. 3

**a)**

$$
\begin{aligned}
B_{20;0.5}(10) &\approx 20\% \\
B_{20;0.5}(11) &\approx 15\% \\
B_{20;0.8}(15) &\approx 20\% \\
F_{20;0.5}(10) &\approx 50\% \\
F_{20;0.5}(11) &\approx 70\% \\
F_{20;0.8}(15) &\approx 30\%
\end{aligned}
$$

# 3. S. 289 Nr. 5

**Erwartungswert** $n = 10 \ \wedge p = 0.6$ **:**

$$
\begin{aligned}
\mu &= n \cdot p \\
\mu &= 10 \cdot 0.6 \\
\mu &= 6
\end{aligned}
$$

**Standardabweichung** $n = 10 \ \wedge p = 0.6$ **:**

$$
\begin{aligned}
\sigma &= \sqrt{n \cdot p \cdot (1 - p)} \\
\sigma &= \sqrt{10 \cdot 0.6 \cdot 0.4} \\
\sigma &= \sqrt{2.4} \\
\sigma &\approx 1.549
\end{aligned}
$$

$2\sigma$**-Intervall :**

$$
\begin{aligned}
&P(\mu - 2\sigma \leq X \leq \mu + 2\sigma) \\
&\Rightarrow P(6 - 2 \cdot \sqrt{2.4} \leq X \leq 6 + 2 \cdot \sqrt{2.4}) \\
&\Rightarrow P(2.9 \leq X \leq 9.09) \\
&\Rightarrow P(3 \leq X < 9) \\
&\Rightarrow P(3 \leq X < 9) \approx 98.165\%
\end{aligned}
$$

**Erwartungswert** $n = 20 \ \wedge p = 0.6$ **:**

$$\begin{aligned}\mu &= n \cdot p \\ \mu &= 20 \cdot 0.6 \\ \mu &= 12\end{aligned}$$

**Standardabweichung** $n = 20 \ \wedge p = 0.6$ **:**

$$\begin{aligned}\sigma &= \sqrt{n \cdot p \cdot (1-p)} \\ \sigma &= \sqrt{20 \cdot 0.6 \cdot 0.4} \\ \sigma &= \sqrt{4.8} \\ \sigma &\approx 2.19\end{aligned}$$

$2\sigma$**-Intervall** **:**

$$\begin{aligned}&P(\mu - 2\sigma \leq X \leq \mu + 2\sigma) \\ &\Rightarrow P(12 - 2 \cdot \sqrt{4.8} \leq X \leq 12 + 2 \cdot \sqrt{4.8}) \\ &\Rightarrow P(7.618 \leq X \leq 16.38) \\ &\Rightarrow P(7 < X < 17) \\ &\Rightarrow P(7 < X < 17) \approx 98.99\%\end{aligned}$$

# 4. S. 289 Nr. 6

**a)**