

① $X \sim \text{Alt}(p)$, tj: $P(X=1)=p$ a $P(X=0)=1-p$
 Data: 4×1 a 32×0 (tj. např. $x_1 = \dots = x_4 = 1, x_5 = \dots = x_{36} = 0$)
 $L(p) = p^4 (1-p)^{32}$
 $\ell(p) = \ln L(p) = 4 \ln p + 32 \ln(1-p)$
 $\ell'(p) = \frac{4}{p} + \frac{32}{1-p} \cdot (-1) \Rightarrow \frac{4}{p} - \frac{32}{1-p} = 0 \Rightarrow \hat{p} = \underline{\underline{\frac{1}{9}}}$

② $X_i = 1$, pokud i -tá stříle skončí gólem } tj.
 $= 0$, — " — nekončí " — } tj.
 $X_i \sim \text{Alt}(\frac{1}{9}) \Rightarrow \mathbb{E}X_i = \frac{1}{9}, \text{ var } X_i = \frac{1}{9} \cdot \frac{8}{9} = \frac{8}{81}$
 $P\left(\sum_{i=1}^{72} X_i \geq 10\right) = P\left(\underbrace{\frac{\sum X_i - 72 \cdot \frac{1}{9}}{\sqrt{72 \cdot \frac{8}{81}}}}_Z \geq \underbrace{\frac{10 - 72 \cdot \frac{1}{9}}{\sqrt{72 \cdot \frac{8}{81}}}}_{\frac{10-8}{\sqrt{\frac{9 \cdot 8^2}{9^2}}} = \frac{2}{\frac{3 \cdot 8}{9}} = \frac{3}{4}}\right) =$
 $= P\left(Z \geq \frac{3}{4}\right) = 1 - P(Z < 0,75) = 1 - \Phi(0,75) =$
 $= 1 - 0,77 = \underline{\underline{0,23}}$