Зад 4

$P(\text{выпадет 5 или 6}) = \frac{2}{6} = \frac{1}{3}$

$X_1 \sim Bp$: $X_1 \begin{cases} 1, & 1/3 = p \\ 0, & 2/3 = 1-p \end{cases}$

$\vdots$

$X_{120} \begin{cases} 1, & 1/3 \\ 0, & 2/3 \end{cases}$

$E(X_1 + \ldots + X_{120}) = 120 \cdot p = 40$

$Var(X_1 + \ldots + X_{120}) = 100(p - p^2) = 80/3$

Неравенство Чебышева:

$|X - 40| \le 10$

$P(30 \le X \le 50) = P(|X - EX| \le 10)$

$1 - P(|X - 40| > 10) \ge 1 - \frac{Var X}{t^2} = 1 - \frac{80/3}{100} = \frac{11}{15} \approx 0{,}73$

ЦПТ

$P(30 \le S_n \le 50) = \left(\frac{a - ES_n}{\sqrt{Var X}} \le \frac{S_n - ES_n}{\sqrt{Var X}} \le \frac{b - ES_n}{\sqrt{Var X}} \right)$

$= P\left(\frac{30-40}{\sqrt{80/3}} \le \frac{S_n - ES_n}{\sqrt{Var X}} \le \frac{50-40}{\sqrt{80/3}} \right) =$

$= \Phi\left(\frac{10}{\sqrt{80/3}}\right) - \Phi\left(-\frac{10}{\sqrt{80/3}}\right) = 2\Phi\left(\frac{10}{\sqrt{80/3}}\right) - 1 =$

$\approx 2\Phi(1.93) - 1 \approx 2 \cdot 0{,}97 - 1 \approx 0{,}94$