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(P1) B : benefici

a) $P(\bar{X} < B) = P\left(\underbrace{\frac{\bar{X}-\mu_x}{\sigma_x}}_{Z_1} < \frac{B/100 - 100}{10/\sqrt{100}}\right) = 0{,}8$

$\frac{B}{100} - 100 = 0{,}84 \longrightarrow \boxed{B = 10.084\ \$}$

b) Prob. que sobri diners

$$\boxed{P\left(50 < \bar{X} < \frac{4000}{50}\right)} = P\left(\frac{50-100}{10/\sqrt{100}} < Z_1 < \frac{80-100}{10/\sqrt{100}}\right) =$$

Ho fem segons els 100 inicials

$$= P(Z < -20) - P(Z_1 < -50) \simeq 0 - 0 \simeq \boxed{0}$$

No sobrerà diners

(P2) $\frac{S_n}{n} = 0{,}5 \qquad \mu = 0{,}55 \qquad \sigma = \sqrt{0{,}55 \cdot 0{,}45} \simeq 0{,}4975$

$P\left(Z < \frac{S_n/n - \mu}{\sigma/\sqrt{n}}\right) = 0{,}9 \implies \frac{0{,}5 - 0{,}55}{0{,}4975/\sqrt{n}} = 1{,}2816$

$n = \left(\frac{1{,}2816 \cdot 0{,}4975}{-0{,}05}\right)^2 \simeq 163$

(P3) $f(x) = \begin{cases} 1/2 \cdot e^{-\frac{x}{2}} & x \geq 0 \\ 0 & x < 0 \end{cases} \rightarrow \begin{array}{l} \mu = 2 \\ \sigma = \sqrt{Var} = 2 \end{array}$

$P\left(Z < \frac{2{,}5-2}{2/\sqrt{n}}\right) = P(Z_1 < 0{,}25\sqrt{n})$

a) $n = 16 \quad P(Z_1 < 1) = 0{,}8413$

b) $n = 36 \quad P(Z_1 < 1{,}5) = 0{,}9332$

c) $n = 100 \quad P(Z_1 < 2{,}5) = 0{,}9938$

(P4) $\mu = \alpha \cdot \theta = 50$

$\sigma = \sqrt{Var} = \sqrt{\alpha\theta^2} = 22,36$

$$P\left(\bar{X} > \frac{2190}{n}\right) = P\left(Z > \frac{\frac{2190}{40} - 50}{22,36/\sqrt{40}}\right) = 1 - P(Z < 1,344) = 1 - 0,9099 = 0,0901$$