

Усг 1, ЗНЗ, 2022.11.24., В СОР

$$\textcircled{1} \quad X \sim \text{BIN}(n, \frac{1}{6}) \quad P\left(\frac{X}{n} \geq 0.15\right) = P(X \geq 0.15 \cdot n) =$$

$$= P\left(\frac{X - \frac{1}{6} \cdot n}{\sqrt{n \cdot \frac{1}{6} \cdot \frac{5}{6}}} \geq \frac{(0.15 - \frac{1}{6}) \cdot n}{\sqrt{n \cdot \frac{1}{6} \cdot \frac{5}{6}}}\right) \stackrel{\substack{\text{DE} \\ \text{MOIVRE}}}{\approx} 1 - \Phi\left(\frac{0.15 - \frac{1}{6}}{\sqrt{5/6}} \cdot \sqrt{n}\right) =$$

$$\Phi\left(\frac{1/6 - 0.15}{\sqrt{5/6}} \cdot \sqrt{n}\right) \geq 0.99 \Rightarrow \frac{1/6 - 0.15}{\sqrt{5/6}} \cdot \sqrt{n} \geq 2.33 \Rightarrow$$

$$n \geq \left(2.33 \cdot \frac{\sqrt{5/6}}{1/6 - 0.15}\right)^2 = 2714.45$$

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n ЛЕГЧЕН ЛЕГКА' ББ 2715

$$\textcircled{2} \quad A_i := \mathbb{1}[i\text{-EDIK } \exists \text{ ELEMENTEZO KAP LEGAKA'BB 1 AZANLAIOT}]$$

$$E(X) = E\left(\sum_{i=1}^{12} \mathbb{1}[A_i]\right) \stackrel{\text{LIN}}{=} \sum_{i=1}^{12} E(\mathbb{1}[A_i]) = \sum_{i=1}^{12} P(A_i) =$$

$$= 12 \cdot P(A_1) = 12 \cdot (1 - P(A_1^c)) = 12 \cdot \left(1 - \left(\frac{11}{12}\right)^{10}\right) =$$

$$= \underline{6.9731}$$

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$$\textcircled{3} \quad f_X(x) = \int_{-\pi/4}^{\pi/4} B \cdot \cos(x-y) dy = B \cdot \left[ \sin(x-y) \right]_{-\pi/4}^{\pi/4} =$$

$$= B \cdot (-\sin(x - \pi/4) + \sin(x + \pi/4)), \quad \text{NA} \quad -\pi/4 < x < \pi/4$$

$$\int_{-\pi/4}^{\pi/4} f_X(x) dx = B \cdot \int_{-\pi/4}^{\pi/4} (\sin(x + \pi/4) - \sin(x - \pi/4)) dx =$$

$$= B \cdot \left[ -\cos(x + \pi/4) + \cos(x - \pi/4) \right]_{-\pi/4}^{\pi/4} =$$

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$$= B \cdot \left( -\cos\left(\frac{\pi}{2}\right) + \cos(0) + \cos(0) - \cos\left(-\frac{\pi}{2}\right) \right) = 2 \cdot B$$

TEHAT  $B = \frac{1}{2}$ ,  $f_{xy}(x) = \frac{1}{2} \cdot (\sin(x + \frac{\pi}{4}) - \sin(x - \frac{\pi}{4}))$   
 HA  $-\frac{\pi}{4} < x < \frac{\pi}{4}$

$$f(x, y) \equiv f(y, x), \text{ így } f_{xy}(y) = f_{yx}(y) =$$

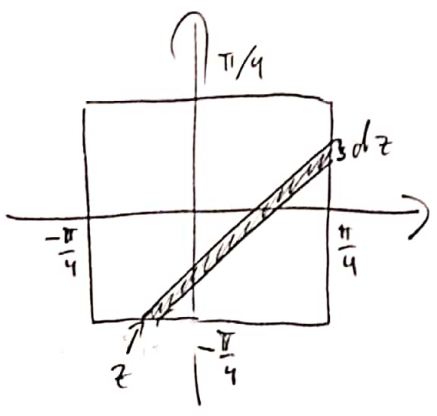
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$$\frac{1}{2} \cdot (\sin(y + \frac{\pi}{4}) - \sin(y - \frac{\pi}{4})) \text{ HA } -\frac{\pi}{4} < y < \frac{\pi}{4}$$

$$f) f_{xy}(x|0) = \frac{f(x, 0)}{f_y(0)} = \frac{\frac{1}{2} \cos(x)}{\frac{1}{2} \cdot (\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2})} = \frac{\cos(x)}{\sqrt{2}} \cdot \mathbb{I}[-\frac{\pi}{4} < x < \frac{\pi}{4}]$$

$P(X > 0 | Y = 0) = \frac{1}{2}$  HISZ  $f_{xy}(x|0)$  PÁROS FÜGGVÉNY (4)

BONUSZ:



$$f_z(z) = \frac{1}{2} \cos(z) \cdot \left( \frac{\pi}{2} - |z| \right)$$

HA  $-\frac{\pi}{2} < z < \frac{\pi}{2}$

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Z. OCLAL