Lista 4

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1) $E(x) = \sum_{i=1}^{n} x_i \cdot P(x = x_i)$

$10 \cdot 0,1 + 12 \cdot 0,3 + 15 \cdot 0,5 + 20 \cdot 0,1$

$1 + 3,6 + 7,5 + 2$

$E(x) = 14,1$

$DP = \sqrt{Var(x)} \quad Var(x) = E(x^2) - \mu_x^2$

$10^2 \cdot 0,1 + 12^2 \cdot 0,3 + 15^2 \cdot 0,5 + 20^2 \cdot 0,1$

$\sqrt{205,7 - 14,1^2}$

$DP = 2,62$

2) $P(X=x) = \binom{n}{x} \cdot p^x \cdot q^{n-x}$

$n = 5$

$x = 2$ $\quad \frac{5!}{2! \cdot 3!} \cdot 0,2^2 \cdot 0,8^3$

$p = 0,2$

$q = 0,8$ $\quad \frac{20 \cdot 0,04 \cdot 0,512}{2}$

$\frac{0,4096}{2} = 0,2048$

$\therefore P(X=2) = 0,2048$

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3) $P(X=x) = \frac{e^{-\lambda} \cdot \lambda^x}{x!}$

$e = 2,718$

2 ou mais = $1 - (P(0) + P(1))$

a) 2,8 — 60
λ — 30
$\lambda = 1,4$

$1 - \left(\frac{2,718^{-1,4} \cdot 1,4^0}{0!} + \frac{2,718^{-1,4} \cdot 1,4^1}{1!} \right)$

$1 - \left(\frac{2,718^{-1,4}}{1} + \frac{2,718^{-1,4} \cdot 1,4}{1} \right)$

$1 - 0,592$

$\therefore = 0,408$

b) $\lambda = 2,8$

$1 - \left(\frac{2,718^{-2,8} \cdot 2,8^0}{0!} + \frac{2,718^{-2,8} \cdot 2,8^1}{1!} \right)$

$1 - \left(\frac{2,718^{-2,8}}{1} + \frac{2,718^{-2,8} \cdot 2,8}{1} \right)$

$\therefore = 0,768$

c) $\lambda = 5,6$

$1 - \left(\frac{2,718^{-5,6} \cdot 5,6^0}{0!} + \frac{2,718^{-5,6} \cdot 5,6^1}{1!} \right)$

$1 - \left(\frac{2,718^{-5,6}}{1} + \frac{2,718^{-5,6} \cdot 5,6}{1} \right)$

$\therefore = 0,975$

4) $P(X=5) = \frac{20!}{5! \, 15!} \cdot 0,1^5 \cdot 0,9^{15}$

$n = 20$

$x = 5$ $\quad \therefore P(x=5) = 0,3192$

$p = 0,1$

$q = 0,9$

5) $Var(x) = \underbrace{m \cdot p}_{\mu_x} \cdot q$

$8 = 12 \cdot q \rightarrow 8 = m \cdot \frac{1}{3} \cdot \frac{2}{3}$

$q = 2/3 \quad \therefore m = 36$

6) $P(X=x) = \frac{e^{-\lambda} \cdot \lambda^x}{x!}$

$e = 2,718$

$\lambda = 4$

a) $P(4) = \frac{2,718^{-4} \cdot 4^4}{4!}$

$\frac{2,718^{-4} \cdot 2000}{24}$

$= 0,1954$

b) $P(0) + P(1) + P(2) =$

$\frac{2,718^{-4} \cdot 4^0}{0!} + \frac{2,718^{-4} \cdot 4^1}{1!} + \frac{2,718^{-4} \cdot 4^2}{2!}$

$0,0183 + 0,0732 + 0,1465$

$= 0,2315$

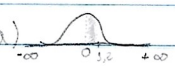
c) $1 - (P(0) + P(1))$

$1 - \left(\frac{2,718^{-4} \cdot 4^0}{0!} + \frac{2,718^{-4} \cdot 4^1}{1!}\right)$

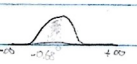
$1 - (0,0183 + 0,0732)$

$= 0,908$

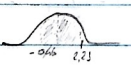
7)

a) 

$P = 0,3849$

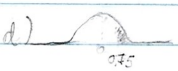
b) 

$P = 0,2517$

c) 

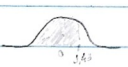
$0,3772 + 0,4864$

$P = 0,6636$

d) 

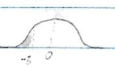
$0,5 - 0,2734$

$P = 0,2266$

e) 

$0,5 + 0,4236$

$P = 0,9236$

f) 

$0,5 - 0,4987$

$P = 0,0013$

g) $0,5 - 0,025$

$= 0,475$

$\therefore z = 1,96$

h) $0,5 - 0,9082$

$= 0,4082$

$\therefore z = 1,33$

i) $z - 0,4750 = 0,01$

$= 0,4850$

$\therefore z = 2,17$

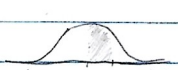
8) $z = \frac{x - \mu}{\sigma}$

$\mu = 63,6$

$\sigma = 2,5$

$z_1 = \frac{63,6 - 63,6}{2,5} = 0$

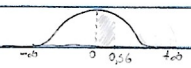
$z_2 = \frac{68,6 - 63,6}{2,5} = 2$



$\therefore$ Probabilidade $= 0,4772$

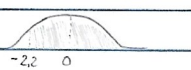
9)

a) $Z_1 = \frac{63,6 - 63,6}{2,5} = 0$ $\quad Z_2 = \frac{65 - 63,6}{2,5} = 0,56$



$\therefore P = 0,2123$

b) $Z_1 = \frac{58,5 - 63,6}{2,5} = -2,2$

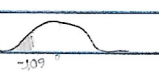


$0,5 + 0,4861$

$\therefore P = 0,9861$

10) $\mu = 8,2$ $\quad Z = \frac{7 - 8,2}{3,3} = -3,09$

$\sigma = 3,3$



$0,5 - 0,3621$

$\therefore P = 0,1379$

11) $\mu = 9,4$ $\quad Z_1 = \frac{5 - 9,4}{4,2} = -1,04$ $\quad Z_2 = \frac{8 - 9,4}{4,2} = -0,33$

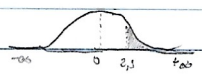
$\sigma = 4,2$

$0,3508 - 0,1293$

$\therefore P = 0,2215$

12) $\mu = 100$ $\quad Z = \frac{131,5 - 100}{15} = 2,1$

$\sigma = 15$

a) 

$0,5 - 0,4821$

$\therefore P = 0,0179$

b) $P = 1,79\%$

$70000 \cdot 1,79\%$

$= 1253$