Bruno Braga

LISTA 2:

1) A) $\frac{50}{150} = 0,33$ B) $\frac{65+50}{150} = 0,76$ C) $\frac{80}{150} = 0,53$ D) $\frac{35}{150} = 0,2$ E) $P(A) = $ homem

$P(B) = < 25$ anos

$P(A \cap B) = \frac{30}{80} = 0,37$

$P(A)$

2) $P(D|c_1) = 4/10$

$P(D|c_2) = 1/6$

$P(D|c_3) = 3/8$

$P(D) = \frac{1}{3} \cdot \frac{4}{10} + \frac{1}{3} \cdot \frac{1}{6} + \frac{1}{3} \cdot \frac{3}{8} = 0,31$

B) $P(c_1|D) = \frac{P(D|c_1) \cdot P(c_1)}{P(D)} = 0,42$

3) $P(+)(m) = 0,01$ $P(m|A) = \frac{P(A|M)}{P(A)} = 0,2727$

$P(A|H) = 0,04$

$P(m) = 0,6$

$P(H) = 0,4$ $P(+) = 0,022$

4) $P(s) = P(T) = P(a_A) = P(a_i) = P(s_x) = 0,2$

$P(A|S) = 0,05$

$P(A|T) = P(A|a_A) = P(a_i) = 0,01$ $P(S|A) = \frac{0,05 \times 0,2}{0,022} = 0,4545$

$P(A|S_x) = 0,03$

$P(A) = 0,2(0,5 + 0,01 + 0,01 + 0,01 + 0,03) = 0,022$

5) $P(P|C) = 0,95$ $P(C|P) = \frac{0,95 \times 0,02}{0,68} = 0,27$

$P(P|NC) = 0,03$

$P(C) = 0,02$ $P(P) = 0,68$

$P(NC) = 0,98$

⑥ A) $P(2x)) = \dfrac{12}{70} \cdot \dfrac{11}{19} = 0,3$ B) $P(2xP) = \dfrac{3}{20} \cdot \dfrac{7}{19} = 0,14$

C) $P(D e P) = \dfrac{8}{20} \cdot \dfrac{12}{19} \cdot 21 = 0,5$ D) $\dfrac{12}{19} = 0,63$

⑦ A) $P(\overline{ac}) 0,4 \wedge 0,99 + 0,3 \cdot 0,98 + 0,1 \cdot 0,97 + 0,2 \cdot 0,96 \sim 0,97$

$P(E) = 1 - P(\overline{ac}) = 0,021$

$P(E|L_1) = 0,01$

$P(L_1|E) = \dfrac{0,01 \cdot 0,4}{0,021} = 0,19$

$L \to 20\%$

⑧
$B \to 26\%$ A) $0,55$

B) 32%

C) $0,17$

$total = 45\%$ $C \to 14\%$
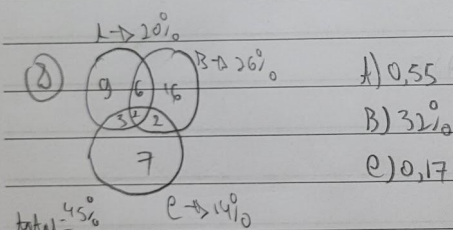
⑨ $P(\tilde{n} \; atrasar) = P(todos os serão abertos)$

$P(e_1) = 0,096$ $P(e_2) = 0,08$ $P(e_1 ou e_2) = 0,18$

B) $P(e_2 | \tilde{n} \; atrasar) \dfrac{0,08 \cdot 0,4}{0,13} = 0,18$

⑩ $total = 3080$

$A = 0,03$ $B = 0,00097$ $C = 0,02$ $D = 0,35$

Variáveis aleatórias:

① $7,48 \; cm \leq x \leq 7,52 \; cm$

tilibra $\mu (média) = 7,505$ $\sigma (DP) = 0,01$

$P(7,48 < x < 7,52) = 0,9332 - 0,006) = 0,927$

$P(x < 7,52) = 0,9332$ $\qquad$ $P(x < 7,42) = 0,006)$

$\dfrac{7,52 - 7,505}{0,01} = 1,5 \to 0,9332$ $\qquad$ $\dfrac{7,42 - 7,505}{0,01} = -1,5 \to 0,006)$

B) rvvv $\to (0,927)^4 = 0,7385$

vvvc $\to (0,927)^3 \cdot (1 - 0,927) \cdot \dfrac{4!}{3!} = 0,23$

vvrv ou vvvr $\to 0,7385 + 0,2326 = 0,9710$

e) $m \sim 10$

$(1 - 0,9)^3 \cdot (0,9)^7 \cdot \dfrac{10!}{3! \, 7!} = 0,02$

② $\mu(\text{média}) = 550$ $\quad \sigma(DP) = 120$

A) $1 \cdot P(x > 700) = 1 - P(x < 700) = 0,1056$

$Z = \dfrac{700 - 550}{120} = 1,25 \to 0,89$

A.2) $P(x < 200) = 0,0018$

$Z = \dfrac{200 - 500}{120} = -2,916 \to 0,0018$

A.3) $P(200 < x < 700) = 0,8944 - 0,0018 = 0,89$

B) $Z = \dfrac{x - 550}{120} = 1,44 \to 0,925$ $\qquad x = 722,8$

$Z = \dfrac{x - 550}{120} = -1,44 \to 0,075$ $\qquad x = 377,2$

c) $Z = \dfrac{x - 550}{120} = 1,65 \to 0,95$

$x = 747$

③ $\mu = 11,53 \, cm \quad \sigma = 0,64 \, cm$

A.1) $P(x > 10) = 1 - P(x < 10) = 1 - 0,0084 = 0,9916$

$Z = \dfrac{10 - 11,53}{0,64} = -2,3906 = 0,0084$

A.2) $P(10 < x < 12) = P(x < 12) - P(x < 10) = 0,7673 - 0,0084 = 0,7589$

$P(x < 12) = \dfrac{12 - 11,53}{0,64} = 0,7343 \to 0,7673$

B) $P(x > 20\%) = 0,8$

$Z = \dfrac{x - 11,53}{0,64} = 0,84 \to 0,8$

$x = 13,067$

e) $P(x < 95\%)$

$Z = \dfrac{x - 11,53}{0,64} = 1,65 \to P(x) = 0,95$

$x = 12,536$

④ $- f_0(x) = \lambda e^{-\lambda x}$

$f_0(x) = 1 - e^{-\lambda x}$

$f_0(x) = 1 - e^{-\frac{1}{200} \cdot 100} = 0,39$

$1 - f_0(x) = 0,60$

B) VVVVXX $\to (0,60)^4 \cdot (0,39)^2 \cdot \dfrac{6!}{4! \, 2!} = 0,31$

VVVVVV $\to (0,60)^6 = 0,0049$

VVVVVX $\to (0,60)^5 \cdot (0,39) \cdot \dfrac{6!}{5!} = 0,19$

$\text{Soma} = 0,55$

⑤ $P(x > 22) = 1 - P(x < 22) = 1 - 0,8665 = 0,1335$

$Z = \dfrac{22 - 21}{0,9} = 1,111 \to 0,8665$

$P(x < 18):$

$Z = \dfrac{18 - 21}{0,9} = 0,004$

$P(x < 18 \text{ ou } x > 22) = 0,1339$

⑥ $A) (0,8)^5 = 0,3277$

B) $1 - P(\text{sobreviver}) - P(\text{todos morrem}) = 0,99$

$P(1 \text{ sobrevivente}) = (0,2)^4 \cdot (0,8) \cdot \dfrac{5!}{4!} = 0,0064$

$P(\text{todos morrem}) = (0,2)^5 = 0,00032$

C) $0,99$

⑦ $P(\text{defeituosa}) = 0,03$

A) $(0,97)^{10} = 0,73$

B) $(0,97)^5 = (0,03)^6 \cdot \dfrac{10!}{5! \, 5!} = *$

C) $P(\text{nenhuma def.}) = 0,7374$

$P(d=1) = (0,03) \cdot (0,97)^9 \cdot \dfrac{10!}{9!} = 0,2280$

$1 - P(D=0) - P(D=1) = 0,0345$

7) $1 - P(D=0) - P(D=1) - P(D=2) + P(D=3)$

$P(D=2) = (0,97)^2 \cdot (0,03)^2 \cdot \dfrac{10!}{8! 2!} = 0,03174$

$P(D=3) = (0,97)^3 \cdot (0,03)^3 \cdot \dfrac{10!}{7! 3!} = 0,00261$

8) A) $(0,7)^6 = 0,11765$

B) FFNNNN, FFFNNN, FFFFNN, FFFFFN, FFFFFF

$1 - P(FNNNNN) - 1 - P(NNNNNN) = 0,57$

9) $P(x=\lambda) = \dfrac{e^{-\lambda} \cdot \lambda^x}{x!}$

B) $\lambda = 10/2$

$P(x=2) = \dfrac{e^{-10} \cdot 10^2}{2!} = 0,00023$

10) $\lambda = 2/100 = 1150$

A) $\lambda = 5/250$

pelo menos 3: $1 - P(x < 3)$

$1 - \left[\dfrac{e^{-5} \cdot 5^2}{2!} + \dfrac{e^{-5} \cdot 5}{1!} + \dfrac{e^{-5} \cdot 5^0}{0!} \right] = 0,8753$

B) $\lambda = 6/300$

$P(x=5) = \dfrac{e^{-6} \cdot 6^5}{5!} = 0,16$

11) A) $\lambda = 8/200$

$P(x=5) = \dfrac{e^{-8} \cdot 8^5}{5!} = 0,0916$

B) $2 \to 50$ min $1 - P(x < 3) = 1 - \left[\dfrac{e^{-4,48} \cdot 4,48^2}{2!} + e^{-4,48} \cdot 4,48 + e^{-4,48} \right] = 0,8241$

$t \to 112$ min

$t = 4,48$

(12) A) $\lambda = 4/10$

$P(t = 0) = e^{-4} = 0,0183$

B) $\lambda = 5 \to 2$

$7,5 \to \lambda$ $P(x \le 3) = \dfrac{e^{-3} \cdot 3^3}{3!} + \dfrac{e^{-3} \cdot 3^2}{2!} + e^{-3} \cdot 3 + e^{-3} = 0,64$

$t = 3$

(13) $\lambda = 4/1000$

A) $P(t = 0) = e^{-4} = 0,183$

B) $1 - P(x < 3) = \dfrac{e^{-4} \cdot 4^2}{2!} + e^{-4} \cdot 4 + e^{-4} = 0,76$

(14) $(0,5)^5 + (0,5)^5 \cdot \dfrac{10!}{5! \cdot 5!} = 0,24$

B) $P(x \ge 8) = \left(0,5^{10} \cdot \dfrac{10!}{2! \cdot 2!} + 0,5^{10} \cdot \dfrac{10!}{9!} + 0,5^{10} \right) = 0,5469$
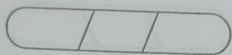
(15) A) $F(x < 20) = 1 - e^{-1/10 \cdot 70} = 0,36$

B) $P(x > 10) = 1 - F(x < 10) = 1 - [1 - e^{-1}] = 0,36$

(16) Combinação c/ aids $= \binom{4}{2} \dfrac{4!}{2! \cdot 2!} = 6$

Combinação sem aids $= \binom{4}{12} \dfrac{12!}{4! \cdot 8!} = 495$

$\dfrac{6 \cdot 495}{8008} = 0,3708$

total Combinações: $\binom{6}{16} \dfrac{16!}{6! \cdot 10!} = 8008$

(17) $1 - [(0.6)^5 \div (0.4)^1 \cdot (0.6)^4] = 0.6630$

(18) $\dfrac{e^{-2} \cdot 2}{2!} = 27.07\%$

(19) $1 - e^{-3} = 0.95 = 95\%$

B) $(1 - e^{-5}) - (1 - e^{-2}) = 12.8\%$

(20) A) 11.43% B) 3.5%