

Lista Exercícios - Estatística Computacional

- 1) Dado equilibrado lançado 2x
 A soma ≥ 4
 B soma ímpar
 C um dos lançamentos foi 2
 D o max é 3

$$P(A) \quad n = 6 \cdot 6 = 36$$

$\hookrightarrow A = (1,1)(1,2)(2,1)$ não favoráveis

$$P(A) = 36 - 3 / 36 \Rightarrow 33 / 36 \Rightarrow 11 / 12 \Rightarrow \boxed{91,6\%}$$

$$P(B|C) = P(B \cap C) \quad P(B \cap C) = P(B) + P(C) - P(B \cup C)$$

$$P(B) \quad P(B \cap C) = \frac{1}{2} + \frac{5}{18} - \frac{5}{108} \Rightarrow \frac{51 + 30 - 5}{108} = \frac{76}{108} = \frac{19}{27} \Rightarrow \boxed{27\%}$$

$$P(B \cup C) = P(B) + P(C) - P(B \cap C)$$

$$P(B \cup C) = \frac{1}{2} + \frac{5}{18} - \frac{5}{108} = \frac{54 + 30 - 5}{108} = \frac{79}{108}$$

$$P(B \cap C) = \frac{5}{108} = \frac{5}{108} \quad P(C) = \frac{10}{36} = \frac{5}{18} \quad \frac{5}{18} \times 2 = \frac{10}{18}$$

$$P(A \cap D) \quad P(A) = \frac{11}{12} \quad P(D) = \frac{1}{12} = 8,3\% \quad D = A^c$$

$$P(A \cap D) = 0 \quad \frac{11}{12} + \frac{1}{12} - P(A \cup D) \Rightarrow \frac{12}{12} - 1 = \boxed{0}$$

$$P(C \cup D) \quad P(C) + P(D) - P(C \cap D)$$

$$\frac{5}{18} + \frac{1}{12} - \frac{1}{18} = \frac{60 + 18 - 12}{216} = \frac{66}{216} = \frac{11}{36} = \boxed{30,55\%}$$

$$P(C \cap D) = 2 = 1$$

$$(2,1) \quad 36 \quad 18$$

tilibra

93% eficácia 1% falso-positivo 0,6% dente

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$$

A - tem a doença $P(A) = 0,6\%$
 B - positivo $P(B) = 93\%$

$$P(A|B) = \frac{93\% \times 0,6\%}{94\%} \Rightarrow 0,59\%$$

3) I 5p II 3p III 4p 1,4 II
 3b 5b 2b 2,3,6 III
 4v 2v 2v 5 I

a) P Bola Vermelha $\frac{1 \cdot 4}{6 \cdot 12} + \frac{2 \cdot 2}{6 \cdot 10} + \frac{3 \cdot 2}{6 \cdot 8} = \frac{4}{72} + \frac{4}{60} + \frac{6}{48}$
 $\Rightarrow \frac{20 + 24 + 45}{360} = \frac{89}{360} = 0,24\%$

b) A (urna II) $P(A) = \frac{1}{3}$ $P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$
 B (bola vermelha) $P(B) = \frac{89}{360}$

$$P(A|B) = \frac{2/10 \cdot 1/3}{89/360} = \frac{2 \cdot 360}{10 \cdot 89} = \frac{72}{89} \approx 0,809$$

0,26%

4) a) $\sim ? \{CC, CK, KC, KK\}$ 4

b) se uma cor $\left(\frac{1}{5}\right)^K \cdot \left(\frac{4}{5}\right)^C = \frac{4}{25} \times 2 \text{ longamentos} = \frac{8}{25}$

c) pelo menos uma cor $\left(\frac{4}{5}\right)^2 + \frac{8}{25} = \frac{16}{25} + \frac{8}{25} = \frac{24}{25}$
 2C 1C

tilibra



4 d) dois resultados iguais $\left(\frac{4}{5}\right)^2 + \left(\frac{1}{5}\right)^2 = \frac{16}{25} + \frac{1}{25} = \boxed{\frac{17}{25}}$

5) Amigos = {D, R, N, J} $4! = 24$ possibilidades

Naõ dê o resultado \Rightarrow

R J D N	J N D R	N D J R	9
R D J N	J N D R	N J D R	24
R N J D	J D R N	N J R D	37%

6) $P(X=1) = \frac{1}{8}$ $P(X=3) = \frac{2}{8}$ $P(X=5) = \frac{5}{8}$

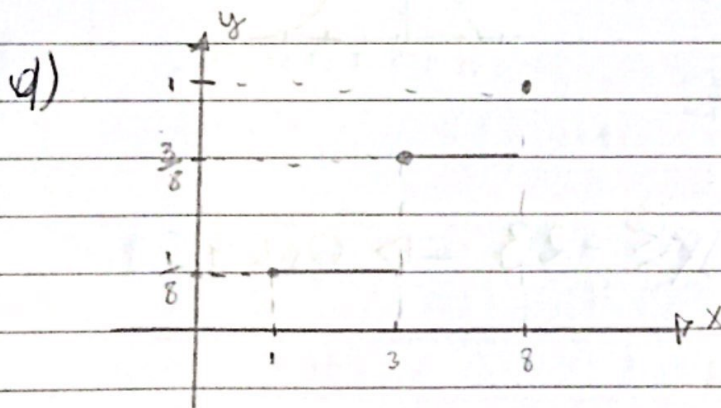
x_i	1	3	5
$P(X=x_i)$	$\frac{1}{8}$	$\frac{2}{8}$	$\frac{5}{8}$

a) $P(X > 2) = \frac{2}{8} + \frac{5}{8} = \frac{7}{8}$ b) $P(X \leq 2) = \frac{1}{8}$

c) $\left(\frac{1}{8} \cdot 1\right) + \left(\frac{2}{8} \cdot 3\right) + \left(\frac{5}{8} \cdot 5\right) = \frac{1}{8} + \frac{6}{8} + \frac{25}{8} = \frac{32}{8} = 4$ \leftarrow esperança

$\frac{1 \cdot 1^2}{8} + \frac{2 \cdot 3^2}{8} + \frac{5 \cdot 5^2}{8} - 4^2 = \frac{1}{8} + \frac{18}{8} + \frac{125}{8} - 16 = \frac{144}{8} - 16 = 2$

variancia



7) a) $X = \{1, 2, 3, 4, 5, 6\}$

b) $P(X=1) \rightarrow 1/36$

$P(X=2) \rightarrow 3/36$

$P(X=3) \rightarrow 5/36$

$P(X=4) \rightarrow 7/36$

$P(X=5) \rightarrow 9/36$

$P(X=6) \rightarrow 11/36$

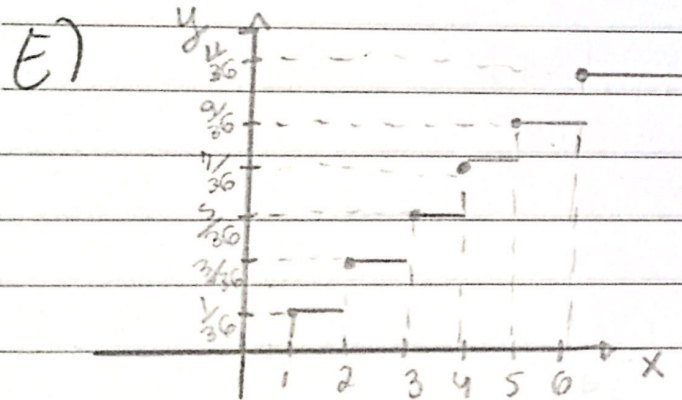
c) $P(X < 3) = P(X=1) + P(X=2)$

$\frac{1}{36} + \frac{3}{36} = \frac{4}{36}$

$P(X \geq 3) = 1 - (X < 3) = 1 - 0,11 = 88,9\%$

tilibra

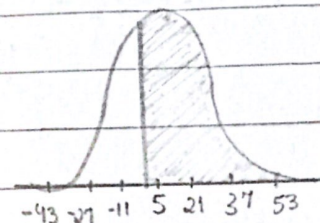
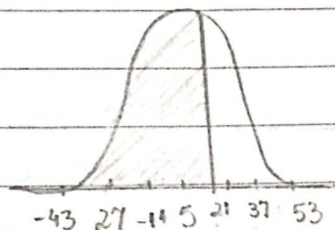
d) $P(x > 2 | x < 5) = \frac{P(x > 2 \text{ e } x < 5)}{P(x < 5)}$
 $\frac{P(3) + P(4)}{1 - P(5) + P(6)}$
 $0,13 + 0,19 / 1 - (0,25 + 0,30) = 0,33 / 0,44 = 74,9\%$



8) $X \sim N(5, 16)$ <https://onlinestatbook.com/2/calculators/normal/dist.html>

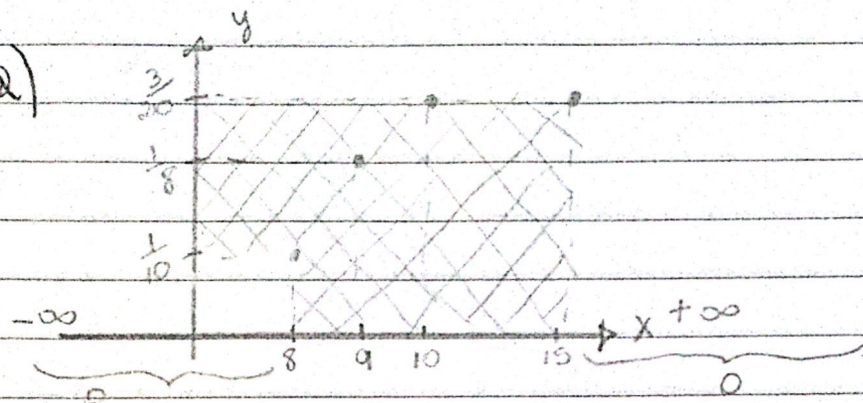
a) $P(X \leq 13) = 0,6915$

b) $P(X > 1) = 0,5987$



d) a) $P(X \leq a) = 0,04 \Rightarrow X \leq -23 \Rightarrow 0,0401$

9 a)



$$b) \int_{-\infty}^{+\infty} f(x) dx = \int_{-\infty}^8 f(x) dx + \int_8^{10} f(x) dx + \int_{10}^{15} f(x) dx + \int_{15}^{+\infty} f(x) dx \Rightarrow$$

$$\rightarrow 0 + \frac{1}{4} + \frac{3}{4} + 0 = \frac{4}{4} = 1$$

c) $P(0 < T \leq 12)$

$$\int_8^{10} \frac{1}{40} (t-4) + \int_{10}^{12} \frac{3}{20} = \frac{1}{4} + \frac{3}{10} = \frac{11}{40}$$

d) $P(9 < T \leq 12)$

$$\int_9^{10} \frac{1}{40} (t-4) + \int_{10}^{12} \frac{3}{20} = \frac{11}{80} + \frac{3}{10} = \frac{17}{16}$$