Exercícios de Revisão p/ P_1 $\underline{P_1}$

1) Rota: $A \rightarrow 3 \rightarrow 4 \rightarrow 8$

Custo: 24

2) a) i) todos os p_i estão entre 0 e 1.

ii) $S = \sum p_i = 0{,}31 + 0{,}16 + 0{,}22 + 0{,}25 + 0{,}06 = 1$ | É Função de Probabilidade

b) média $= \sum x_i \cdot p_i = 1 \cdot 0{,}31 + 2 \cdot 0{,}16 + 3 \cdot 0{,}22 + 4 \cdot 0{,}25 + 5 \cdot 0{,}06 = 2{,}59$

$Var(x) = \sum x_i^2 p_i - (\text{media})^2 = 1{,}7219$

c) $P(2 \leq x < 5) = P(2) + P(3) + P(4) = 0{,}63$

3) $P(X=k) = \binom{4}{k} \cdot (0{,}7)^k (0{,}3)^{4-k}$

a) $P(x=3) = \binom{4}{3}(0{,}7)^3(0{,}3) = 0{,}4116$

b) $P(x>2) = P(3) + P(4) = \binom{4}{3}(0{,}7)^3(0{,}3) + \binom{4}{4}(0{,}7)^4(0{,}3)^0 = 0{,}2401$

c) $P(1 \leq x \leq 3) = P(1) + P(2) + P(3) = 0{,}7518$

d) $P(x=4) = 0{,}2401$

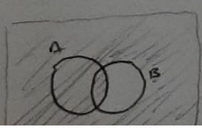
4) $P(A) = 1/2$; $P(B) = 1/4$; $P(A \cap B) = 1/5$

a) $P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{1}{2} + \frac{1}{4} - \frac{1}{5} = \frac{10+5-4}{20} = 11/20$

b) $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{1/5}{1/4} = 4/5$

c) $P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{1/5}{1/2} = 2/5$

d) $P(A \cup B^c) = 1 - P(B-A) = 1 - P(B) + P(A \cap B) = 1 - \frac{1}{4} - \frac{1}{5} = \frac{20-5+4}{20} = 19/20$



R2

5) $X \sim U(10) \rightarrow P(x) = 1/10$

a) $P(X \geq 7) = P(7) + P(8) + P(9) + P(10) = \frac{4}{10} = 2/5$

b) $P(3 \leq x \leq 7) = P(3) + P(4) + P(5) + P(6) + P(7) = \frac{5}{10} = 1/2$

c) $P(X < 2 \text{ ou } X \geq 8) = P(1) + P(8) + P(9) + P(10) = \frac{4}{10} = 2/5$

d) $P(X \geq 5 \text{ ou } x > 8) = P(5) + \dots + P(10) = \frac{6}{10} = 3/5$

e) $P(X > 3 \text{ e } X < 6) = P(4) + P(5) = \frac{2}{10} = 1/5$

f) $P(X \leq 9 | X \geq 6) = \frac{P(6 \leq x \leq 9)}{P(X \geq 6)} = \frac{P(6) + \dots + P(9)}{P(6) + \dots + P(10)} = \frac{4/10}{5/10} = 4/5$

6) $X \sim b(15; 0,4)$

a) $P(X \geq 14) = P(15) = \binom{15}{15}(0,4)^{15}(0,6)^{0} = 1,07 \times 10^{-6} \sim 0$

b) $P(8 < x \leq 10) = P(9) + P(10) = \binom{15}{9}(0,4)^9(0,6)^6 + \binom{15}{10}(0,4)^{10}(0,6)^5 = 0,0857$

c) $P(X < 2 \text{ ou } X \geq 11) = P(0) + P(1) + P(11) + \dots + P(15) = 0,01452$

d) $P(X \geq 11 \text{ ou } X > 13) = P(X \geq 11) = P(11) + \dots + P(15) = 0,0093$

e) $P(X > 3 \text{ e } X < 6) = P(4) + P(5) = 0,3127$

f) $P(X \leq 13 | X \geq 11) = \frac{P(11 \leq x \leq 13)}{P(X \geq 11)} = \frac{P(11) + P(12) + P(13)}{P(11) + \dots + P(15)} = 0,9973$

7) $X \sim b(15; 0,8)$

a) $P(15) = 0,0352$

b) $P(X \leq 13) = 1 - P(14) - P(15) = 0,8329$

c) $P(X \geq 10) = 0,9389$

8) a) $P(X=x) = (0,6)^x (0,4)^{1-x}$, $x = \{0,1\}$

b) $P(X=k) = \binom{4}{k}(0,2)^k(0,8)^{4-k}$; $k = 0,1,2,3,4$

c) $P(X=k) = \binom{8}{k}(0,1)^k(0,9)^{8-k}$, $k = 0,1,2,\ldots,8$

9) $X \sim G(0,4)$

a) $P(X=3) = 0,4 \cdot 0,6^3 = 0,0864$

b) $P(2 \leq X < 4) = P(2) + P(3) = 0,4 \cdot 0,6^2 + 0,4 \cdot 0,6^3 = 0,2304$

c) $P(X>1 \mid X \leq 2) = \dfrac{P(1 < X \leq 2)}{P(X \leq 2)} = \dfrac{P(2)}{P(0)+P(1)+P(2)} = 0,1837$

d) $P(X \geq 1) = 1 - P(0) = 0,6$

10) $P(X=k) = 0,5 \cdot 0,5^k = 0,5^{k+1}$

a) $P(X \leq 2) = P(0)+P(1)+P(2) = 0,5^1 + 0,5^2 + 0,5^3 = 0,875$

b) $P(X>1) = 1 - P(0) - P(1) = 1 - 0,5 - 0,25 = 0,25$

c) $P(3 < X \leq 5) = P(4) + P(5) = 0,046875$

d) 0 — 0,5
1 - 0,75
2 - 0,875 → mais de 80% → DEVEMOS JOGAR, NO MÍNIMO, 3 VEZES A MOEDA

11) $P(X=k) = \dfrac{e^{-1} 1^k}{k!} = \dfrac{e^{-1}}{k!}$

a) $P(X \geq 1) = 1 - P(0) = 1 - e^{-1} = 0,6321$

b) $P(X \leq 2) = P(0)+P(1)+P(2) = e^{-1}\left(2 + \frac{1}{2}\right) = 0,9197$

c) $P(2 \leq X \leq 4) = P(2)+P(3)+P(4) = e^{-1}\left(\frac{1}{2}+\frac{1}{6}+\frac{1}{24}\right) = 0,2606$

d) $P(X \leq 1) = P(0)+P(1) = 2e^{-1} = 0,7358$

12) $X \sim H(10,5,4)$

$P(X=k) = \dfrac{\binom{10}{k}\binom{5}{4-k}}{\binom{15}{4}}$; $k = 0,1,2,3,4$

a) $P(X=2) = \dfrac{\binom{10}{2}\binom{5}{2}}{\binom{15}{4}} = 0,3297$

b) $P(X \leq 1) = P(0) + P(1) = 0,0769$

c) $P(X>0) = 1 - P(0) = 0,9963$