Elementos de Probabilidades - Soluções da Folha 3

1.

	$E[X]$	$Var[X]$	σ_X	$\chi_{0.25}$	$\chi_{0.5}$	$\chi_{0.75}$
1(a) i.	1	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	0	1	1
1(a) ii.	1	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	0	1	1
1(a) iii.	$\frac{161}{36}$	$\frac{2555}{1296}$	$\sqrt{\frac{2555}{1296}}$	3	5	6
1(a) iv.	$\frac{91}{36}$	$\frac{2555}{1296}$	$\sqrt{\frac{2555}{1296}}$	1	2	3
1(a) v.	$\frac{70}{36}$	$\frac{2660}{1296}$	$\sqrt{\frac{2660}{1296}}$	1	2	3
1(a) vi.	7	$\frac{210}{36}$	$\sqrt{\frac{210}{36}}$	5	7	9
1(a) vii.	$\frac{1}{3}$	$\frac{10}{36}$	$\sqrt{\frac{10}{36}}$	0	0	1
3.	$\frac{7}{2}$	$\frac{37}{12}$	$\sqrt{\frac{37}{12}}$	2	4	5

; Primeiro decil: 2; 0.8

2. (a) Sim; (b) Sim

3. (a) 10; 4.4; (b) 10.1; (c) -3; 14.3

4. (a) 25 (valor médio) e 28.75 (variância);
(b) $N = 11$ é o menor

5. (a) 4×0.6^9; 4.6×0.6^9; 0.4^{10};
(b) 45×0.5^{10}, $1 - 11 \times 0.5^{10}$;
(c) igual a (b)
(d) $\left(\frac{3}{5}\right)^4$; $\left(\frac{2}{5}\right)^4$; 0 no caso de extracção sem reposição

Exercícios Suplementares à Folha 3

1.

	$E[X]$	$Var[X]$	σ_X	$\chi_{0.25}$	$\chi_{0.5}$	$\chi_{0.75}$
1.	3.15	2.1275	$\sqrt{2.1275}$	2	3	4
2.	$\frac{13}{6}$	$\frac{11}{36}$	$\frac{\sqrt{11}}{6}$	$\sqrt{3}$	$\sqrt{5}$	$\sqrt{7}$
3.	0	$\frac{1}{6}$	$\frac{\sqrt{6}}{6}$	$-1+\frac{\sqrt{2}}{2}$	0	$1-\frac{\sqrt{2}}{2}$

; Nono decil: 5; $\sqrt{8.2}$; $1-\frac{\sqrt{5}}{5}$

2. (a) $F_X(c) = \begin{cases} 0 & se \quad c < 0 \\ c^3(4-3c) & se \quad 0 \le c \le 1 \\ 1 & se \quad c > 1 \end{cases}$; $E[X] = \frac{3}{5}$; $Var[X] = \frac{1}{25}$

(b) i. $L : \begin{cases} 8 & 13 & 18 \\ \frac{3}{27} & \frac{13}{27} & \frac{11}{27} \end{cases}$; ii. $\frac{391}{27}$

(c) $Y \sim Bin(5, \frac{1}{9})$; $Y : \begin{cases} 0 & 1 & 2 & 3 & 4 & 5 \\ (\frac{8}{9})^5 & 5 \times \frac{8^4}{9^5} & 10 \times \frac{8^3}{9^5} & 10 \times \frac{8^2}{9^5} & 5 \times \frac{8}{9^5} & (\frac{1}{9})^5 \end{cases}$

3. (a) $X : \begin{cases} 1 & 2 & 3 \\ \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \end{cases}$; $Y : \begin{cases} 2 & 3 \\ \frac{1}{3} & \frac{2}{3} \end{cases}$; $E[X] = 2$; $Var[X] = \frac{2}{3}$; $E[Y] = \frac{8}{3}$; $Var[Y] = \frac{2}{9}$

(b) $\frac{1}{4}$ e 0; X e Y não são independentes

(c) i. $S : \begin{cases} 3 & 4 & 5 & 6 \\ \frac{1}{6} & \frac{2}{6} & \frac{1}{6} & \frac{2}{6} \end{cases}$; $T : \begin{cases} 0 & 1 & 2 \\ \frac{3}{6} & \frac{2}{6} & \frac{1}{6} \end{cases}$; ii. $\frac{14}{3}$; $\frac{2}{3}$; $\frac{11}{9}$; $\frac{5}{9}$

4. (a) — (b) $N \sim Exp(n\lambda)$