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Estatística e Probabilidade

Exercício 4 Semana 8

X = "soma das faces voltadas para cima"

$X \in \{2, 3, 4, 5, 6, 7, 8\}$

FACE	Prob.	X
1 1	$\frac{1}{16}$	2
1 2	$\frac{1}{16}$	3
1 3	$\frac{1}{16}$	4
1 4	$\frac{1}{16}$	5
2 1	$\frac{1}{16}$	3
2 2	$\frac{1}{16}$	4
2 3	$\frac{1}{16}$	5
2 4	$\frac{1}{16}$	6
3 1	$\frac{1}{16}$	4
3 2	$\frac{1}{16}$	5
3 3	$\frac{1}{16}$	6
3 4	$\frac{1}{16}$	7
4 1	$\frac{1}{16}$	5
4 2	$\frac{1}{16}$	6
4 3	$\frac{1}{16}$	7
4 4	$\frac{1}{16}$	8

$P(X=2) = \frac{1}{16}$

$P(X=3) = \frac{2}{16}$

$P(X=4) = \frac{3}{16}$

$P(X=5) = \frac{4}{16}$

$P(X=6) = \frac{3}{16}$

$P(X=7) = \frac{2}{16}$

$P(X=8) = \frac{1}{16}$

FDP

$F(x) = \begin{cases} \frac{1}{16} & \text{se } X = 2 \\ \frac{2}{16} & \text{se } X = 3 \\ \frac{3}{16} & \text{se } X = 4 \\ \frac{4}{16} & \text{se } X = 5 \\ \frac{3}{16} & \text{se } X = 6 \\ \frac{2}{16} & \text{se } X = 7 \\ \frac{1}{16} & \text{se } X = 8 \\ 0 & \text{caso contrário} \end{cases}$

FDA

$F(x) = \begin{cases} 0 & \text{se } X < 2 \\ \frac{1}{16} & \text{se } 2 \leq X < 3 \\ \frac{3}{16} & \text{se } 3 \leq X < 4 \\ \frac{6}{16} & \text{se } 4 \leq X < 5 \\ \frac{10}{16} & \text{se } 5 \leq X < 6 \\ \frac{13}{16} & \text{se } 6 \leq X < 7 \\ \frac{15}{16} & \text{se } 7 \leq x\ 8 \\ 1 & \text{se } x \geq 8 \end{cases}$

$$E(X) = \sum_i x \cdot f(x) = 2 \cdot \frac{1}{16} + 3 \cdot \frac{2}{16} + 4 \cdot \frac{3}{16} + 5 \cdot \frac{4}{16} + 6 \cdot \frac{3}{16} + 7 \cdot \frac{2}{16} + 8 \cdot \frac{1}{16}$$

$$E(X) = \frac{2}{16} + \frac{6}{16} + \frac{12}{16} + \frac{20}{16} + \frac{18}{16} + \frac{14}{16} + \frac{8}{16} = \frac{80}{16}$$

$$E = 5$$

$$E(X^2) = \sum x^2 F(x) = 2^2 \frac{1}{16} + 3^2 \cdot \frac{2}{16} + 4^2 \cdot \frac{3}{16} + 5^2 \cdot \frac{4}{16} + 6^2 \cdot \frac{3}{16} + 7^2 \frac{2}{16} + 8^2 \frac{1}{16}$$

$$E(X^2) = 27,5$$

$$\text{var}(X) = 27,5 - 5^2 \qquad \text{var}(X) = 2,5$$