

Día	Mes	Año	Hora	Institución	Código	Materia
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Curso	Bimestre	Semestre	Salón	Hoja No	de	CALIFICACIÓN
Profesor						

① $P(1 < X < 5)$

$$f(x) = \begin{cases} kx^2, & 0 < x < 6 \\ 0, & x \leq 0, x \geq 6 \end{cases}$$

$k = ?$

$$\int_0^6 kx^2 dx = 1 \rightarrow \frac{6^3}{3} k = 1 \quad k = \frac{1}{72}$$

$k = \frac{1}{72}$

$$f(x) = \begin{cases} \frac{1}{72} x^2, & 0 < x < 6 \\ 0, & x \leq 0, x \geq 6 \end{cases}$$

Caso 1

$x \leq 0 \rightarrow F(x) = 0$

Caso 2

$0 < x < 6 \rightarrow F(x) = \int_0^x \frac{1}{72} x^2 dx = \frac{1}{72} \frac{x^3}{3} \Big|_0^x = \frac{x^3}{216}$

Caso 3

$x \geq 6 \rightarrow F(x) = \frac{1}{72} \left(\int_0^6 x^2 dx + \int_6^x x^2 dx \right) = \frac{1}{72} \frac{x^3}{3} \Big|_0^6 + \frac{1}{72} \frac{x^3}{3} \Big|_6^x$
 $= \frac{1}{72} \frac{6^3}{3} = 1$

$$F(x) = \begin{cases} 0, & x \leq 0 \\ \frac{x^3}{216}, & 0 < x < 6 \\ 1, & x \geq 6 \end{cases}$$

$$P(1 < X < 5) = \frac{x^3}{216} \Big|_1^5 = \frac{125}{216} - \frac{1}{216} = \frac{124}{216} = 0.574 \dots \approx 57.4\%$$

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Lanzar 1 dado 2 veces

Tiro₁: $X_1 \in \{1, 2, 3, 4, 5, 6\}$ tiro₂: $X_2 \in \{1, 2, 3, 4, 5, 6\}$

Variable de interés

$$S = X_1 + X_2$$

$S \in \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

Probabilidad cada ^{Par} dado es $\frac{1}{36}$

Funcion probabilidad $P(S=k) \rightarrow \frac{6-|k-7|}{36}$, $k=2, 3, \dots, 12$

Cuantos pares (s_1, s_2) suman k

$$S=2 : (1,1) \rightarrow 1 \text{ caso} \rightarrow P(S=2) = \frac{1}{36}$$

$$S=3 : (1,2), (2,1) \rightarrow 2 \text{ " } \rightarrow P(S=3) = \frac{2}{36}$$

$$S=4 : (1,3), (2,2), (3,1) \rightarrow 3 \text{ " } \rightarrow P = \frac{4}{36}$$

$$S=9 \rightarrow 4 \text{ casos} \rightarrow P = \frac{4}{36}$$

$$S=6 \rightarrow P = \frac{5}{36}$$

$$S=7 \rightarrow P = \frac{6}{36}$$

$$S=8 \rightarrow P = \frac{5}{36}$$

$$S=9 \rightarrow P = \frac{4}{36}$$

$$S=10 \rightarrow P = \frac{3}{36}$$

$$S=11 \rightarrow P = \frac{2}{36}$$

$$S=12 \rightarrow P = \frac{1}{36}$$

Funcion acumulativa

$$\text{si } t < 2 : F_S(t) = 0$$

$$\text{si } 2 \leq t < 3 : F_S(t) = \frac{1}{36}$$

$$\text{si } 3 \leq t < 4 : F_S(t) = \frac{1+2}{36}$$

$$\text{" } 4 \leq t < 5 : F_S(t) = \frac{6}{36}$$

$$\text{" } 5 \leq t < 6 : \text{"} = \frac{10}{36}$$

$$\text{" } 6 \leq t < 7 : \text{"} = \frac{15}{36}$$

$$\text{" } 7 \leq t < 8 : \text{"} = \frac{20}{36}$$

$$\text{" } 8 \leq t < 9 : \text{"} = \frac{25}{36}$$

$$\text{" } 9 \leq t < 10 : \text{"} = \frac{30}{36}$$

$$\text{" } 10 \leq t < 11 : \text{"} = \frac{35}{36}$$

$$\text{" } 11 \leq t < 12 : \text{"} = \frac{35}{36}$$

$$\text{si } t \geq 12 : F_S(t) = 1$$

Valor medio

$$E[X_1] = E[X_2] = \frac{\sum_{i=1}^6 i}{6} = \frac{21}{6} = 3.5$$

$$E[S] = E[X_1] + E[X_2] = 2 \cdot 3.5 = 7$$

Varianza

$$\text{Var}(X_1) = E[X_1^2] - (E[X_1])^2$$

$$E[X_1^2] = \frac{\sum_{i=1}^6 i^2}{6} = \frac{91}{6}$$

$$\text{Var}(X_1) = \frac{91}{6} - \left(\frac{21}{2}\right)^2 = \frac{35}{12}$$

$$\text{Var}(S) = \text{Var}(X_1) + \text{Var}(X_2) = 2 \cdot \frac{35}{12} = 5.833 \dots$$