

Práctica 2

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1) $X =$ "la suma de sus números sea lo a mayor".

$A =$ "aparece un 5 en el primer dado".

$B =$ "aparece un 5 en por lo menos uno de los dados".

$$\bullet X = \{(4, 6), (5, 5), (5, 6), (6, 4), (6, 5), (6, 6)\}.$$

$$\bullet A = \{(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)\}.$$

$$\bullet B = \{(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (1, 5), (2, 5), (3, 5), (4, 5), (6, 5)\}.$$

$$\#S = 6^2 = 36$$

$$a) P(X|A) = \frac{P(A \cap X)}{P(A)} = \frac{(2/36)}{(1/6)} = \boxed{\frac{1}{3}} \approx 0,\overline{3}$$

$$\left(\begin{array}{l} \#(A \cap X) \\ = \{(5, 5), (5, 6)\} \end{array} \right) \left(\begin{array}{l} \#S \\ = \{(5, 1), \dots, (5, 6)\} \end{array} \right)$$

$$b) P(X|B) = \frac{P(B \cap X)}{P(B)} = \frac{\frac{3}{36}}{\frac{11}{36}} = \boxed{\frac{3}{11}} = 0,\overline{27}$$

$$2) X = \{(c, c, c)\}.$$

$$A = \{(c, s, s), (c, s, c), (c, c, s), (c, c, c)\}.$$

$$B = \{(c, s, s), (s, c, s), (s, s, c), (c, c, s), (c, c, c), (s, c, c), (c, s, c)\}.$$

$$\#S = 2^3 = 8$$

$$a) P(X|A) = \frac{\frac{1}{8}}{\frac{1}{2}} = \boxed{\frac{1}{4}} = 0,25$$

$$b) P(X|B) = \frac{\frac{1}{8}}{\frac{7}{8}} = \boxed{\frac{1}{7}} = 0,\overline{142857}$$

3)

$$\#S = 9^2 = 81$$

$$A = \{ (1,1), (3,3), (5,5), (7,7), (9,9) \}$$

$$\#A = 5$$

$$B = \{ (1,1), (1,3), (1,5), (1,7), (1,9), \\ (2,2), (2,4), (2,6), (2,8), \\ (3,1), (3,3), (3,5), (3,7), (3,9), \\ (4,2), (4,4), (4,6), (4,8), \\ (5,1), (5,3), (5,5), (5,7), (5,9), \\ (6,2), (6,4), (6,6), (6,8), \\ (7,1), (7,3), (7,5), (7,7), (7,9), \\ (8,2), (8,4), (8,6), (8,8), \\ (9,1), (9,3), (9,5), (9,7), (9,9) \}$$

$$\#B = 41$$

$$P(A/B) = \frac{\frac{5}{81}}{\frac{41}{81}} = \boxed{\frac{5}{41}} = 0,12195$$

$$4) P(A) = \frac{1}{2} ; P(B) = \frac{1}{3} ; P(A \cap B) = \frac{1}{4}$$

$$a) P(A/B) = \frac{\frac{1}{4}}{\frac{1}{3}} = \boxed{\frac{3}{4}}$$

$$b) P(B/A) = \frac{\frac{1}{4}}{\frac{1}{2}} = \boxed{\frac{1}{2}}$$

$$c) P(A \cup B) = \frac{1}{2} + \frac{1}{3} - \frac{1}{4} = \frac{6}{12} + \frac{4}{12} - \frac{3}{12} = \boxed{\frac{7}{12}}$$

$$d) P(A^c/B^c) = \frac{P(A^c \cap B^c)}{P(B^c)} = \frac{P(A \cup B)^c}{P(B^c)} = \frac{(P(A) + P(B) - P(A \cap B))^c}{1 - P(B)} \xrightarrow{\text{Leyes de Morgan}} \frac{1 - (P(A) + P(B) - P(A \cap B))}{1 - P(B)} \xrightarrow{\text{Propiedad 5}}$$

$$\nearrow P_2$$

$$= \frac{1 - (P(A) + P(B) - P(A \cap B))}{\frac{2}{3}} = \frac{1 - (\frac{1}{2} + \frac{1}{3} - \frac{1}{4})}{\frac{2}{3}}$$

$$= \frac{1 - \frac{7}{12}}{\frac{2}{3}} = \frac{\frac{5}{12}}{\frac{2}{3}} = \boxed{\frac{5}{8}}$$

$$e) P(B^c | A^c) = \frac{P(B^c \cap A^c)}{P(A^c)} = \frac{P(B \cup A)^c}{1 - P(A)} =$$

$$= \frac{(P(B) + P(A) - P(B \cap A))^c}{1 - \frac{1}{2}} = \frac{(\frac{1}{3} + \frac{1}{2} - \frac{1}{4})^c}{\frac{1}{2}}$$

$$= \frac{1 - \frac{7}{12}}{\frac{1}{2}} = \frac{\frac{5}{12}}{\frac{1}{2}} = \boxed{\frac{5}{6}}$$

5) • A_i = "el i -ésimo estudiante elegido es un niño"; $i=1,2,3$.
 • Entonces... $P(A_1 \cap A_2 \cap A_3) = P(A_1) \cdot P(A_2 | A_1) \cdot P(A_3 | A_1 \cap A_2)$

$$= \frac{12 \text{ niños}}{16 \text{ alumnos}} \cdot \frac{11 \text{ niños}}{15 \text{ alumnos}} \cdot \frac{10 \text{ niños}}{14 \text{ alumnos}} = \boxed{\frac{11}{28}} = 0,39285714$$

\nwarrow Probabilidad condicional