

### Ejercicio 3 (2 puntos)

Sean  $A$  y  $B$  dos sucesos aleatorios tales que:

$$P(A) = \frac{3}{4} \quad \& \quad P(B) = \frac{1}{2} \quad \& \quad P(\overline{A} \cap \overline{B}) = \frac{1}{20}$$

Calcúlese:

a)  $P(A \cup B)$       b)  $P(A \cap B)$       c)  $P(\overline{A} | B)$       d)  $P(\overline{B} | A)$

(Madrid - Matemáticas CCSS - Modelo 2010 - Opción B)

**Solución.**

a)  $P(A \cup B) = 1 - P(\overline{A \cup B}) = 1 - P(\overline{A} \cap \overline{B}) = 1 - \frac{1}{20} = \frac{19}{20}$

b)

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B) = \frac{3}{4} + \frac{1}{2} - \frac{19}{20} = \frac{3}{10}$$

c)  $P(\overline{A} | B) = \frac{P(\overline{A} \cap B)}{P(B)} = \frac{P(B) - P(A \cap B)}{P(B)} = \frac{\frac{1}{2} - \frac{3}{10}}{\frac{1}{2}} = \frac{\frac{2}{10}}{\frac{1}{2}} = \frac{2}{10} \cdot 2 = \frac{2}{5}$

d)  $P(\overline{B} | A) = \frac{P(A \cap \overline{B})}{P(A)} = \frac{P(A) - P(A \cap B)}{P(A)} = \frac{\frac{3}{4} - \frac{3}{10}}{\frac{3}{4}} = \frac{\frac{9}{20}}{\frac{3}{4}} = \frac{9}{20} \cdot \frac{4}{3} = \frac{3}{5}$

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