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As Assessment:

Understanding of independent/dependent and mutually exclusive/non-mutually exclusive events

Rubric:

Be able to distinguish between independent/dependent, using formulas of $\mathrm{P(A\ and\ B)} = \mathrm{P(A)}\ times\ P(B\|A)$	Level R: Incomplete	Level 1: Limited	Level 2: Some	Level 3: Considerable	Level 4: In-depth
Be able to distinguish between mutually exclusive/non-mutually exclusive events, using formulas of $\mathrm{P(A\ or\ B)} = \mathrm{P(A)} + \mathrm{P(B)} - \mathrm{P(A\ and\ B)}$	Level R: Incomplete	Level 1: Limited	Level 2: Some	Level 3: Considerable	Level 4: In-depth

1. Given P(A) = 0.375, P(B) = 0.625, P(A or B) = 0.75
   a) Are they mutually exclusive or non-mutually exclusive?
   b) Calculate P (A and B)
   c) Calculate P (B|A)

2. Given P(A) = 0.4, P(B) = 0.6, P(B|A) = 0.5
   a) Are they independent or dependent?
   b) Find out P (A and B)
   c) Find out P (A or B)
   d) Find out P (A|B)

1. Given P(A) = 0.375, P(B) = 0.625, P(A or B) = 0.75
   a) Are they mutually exclusive or non-mutually exclusive?
   b) Calculate P (A and B)
   c) Calculate P (B|A)

a) $\because P(A) + P(B) \neq P(A \text{ or } B)$
$\therefore$ they are non-mutually exclusive.

b) $P(A \text{ and } B) = P(A) + P(B) - P(A \text{ or } B)$
$= 1 - 0.75 = 0.25$

c) $P(B/A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.25}{0.375} = \frac{1}{4} \times \frac{8}{3} = \frac{2}{3}$

2. Given P(A) = 0.4, P(B) = 0.6, P(B|A) = 0.5
   a) Are they independent or dependent?
   b) Find out P (A and B)
   c) Find out P (A or B)
   d) Find out P (A|B)

a) $\because P(B) \neq P(B/A)$
$\therefore$ they are dependent.

b) $P(A \text{ and } B) = P(A) \times P(B/A) = 0.4 \times 0.5 = 0.2$

c) $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = 0.6 + 0.4 - 0.2 = 0.8$

d) $P(A/B) = \frac{P(A \text{ and } B)}{P(B)} = \frac{0.2}{0.6} = \frac{1}{3} \approx 0.33$