Replacement and dependence

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. A bag has 4 green and 3 yellow. After drawing a green without replacement, find the next green chance. [2 marks]

3 green remain out of 6.

Answer: $\frac{1}{2}$.

2. A bag has 4 green and 3 yellow counters. Two counters are drawn at random with replacement. Find $P(\text{two green})$. [2 marks]

$(\frac{4}{7})^2 = \frac{16}{49}$.

Answer: $\frac{16}{49}$.

3. A bag has 4 green and 3 yellow counters. Two counters are drawn at random without replacement. Find $P(\text{two yellow})$. [2 marks]

$(\frac{3}{7})(\frac{2}{6}) = \frac{1}{7}$.

Answer: $\frac{1}{7}$.

4. $P(A) = 0.3$, $P(B) = 0.6$ and $P(A \cap B) = 0.18$. Test independence. [2 marks]

$0.3 \times 0.6 = 0.18$.

Answer: Independent.

5. $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cap B) = 0.3$. Find $P(A \mid B)$ and test independence. [3 marks]

$\frac{0.3}{0.4} = 0.75$.

0.75 differs from $P(A) = 0.5$.

Answer: $\frac{3}{4}$; dependent.

6. Two fair coin tosses are independent. Does a first head make a second tail “due”? Explain. [3 marks]

The second toss remains equally likely to be H or T.

Previous outcomes do not rebalance the next independent trial.

Answer: No.