DIFFERENT PROCESSES LEADING TO RANDOM SEATING ASSIGNMENT

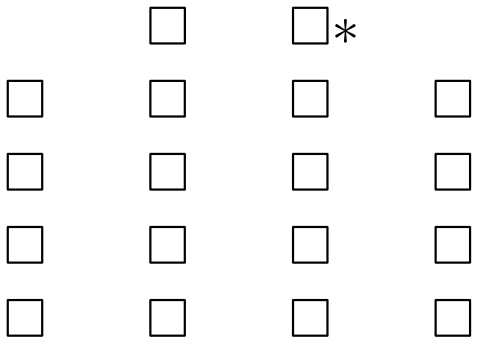
The Scenario

There are 18 seats in a classroom. The seats are arranged as shown in the figure below, and one seat is marked by an *. The teacher is assigning a seat for Cameron.

(1) If the teacher chooses the seat randomly, what is the probability that the * seat is assigned?

(2) If the teacher first chooses a column randomly, and then chooses a row randomly in that column, what is the probability that the * seat is chosen?

(3) If the teacher first chooses a row randomly, and then chooses a column in that row randomly, what is the probability that the * seat is assigned?



Sample Solution

1) $\frac{1}{18}$ as there are 18 seats and we are choosing one out of 18 possible seats.

2) $P(A \text{ and } B) = P(A) \cdot P(B|A)$ where $P(A)$ = probability a column is chosen and $P(B)$ = probability a row is chosen.
So, by our formula, $P(A \text{ and } B) = P(A) \cdot P(B|A)$, we have $P(A \text{ and } B) = \frac{1}{4} \cdot \frac{1}{5} = \frac{1}{20}$

3) $P(A \text{ and } B) = P(A) \cdot P(B|A)$ where $P(A)$ = probability a row is chosen and $P(B)$ = probability a column is chosen.
So, by our formula, $P(A \text{ and } B) = P(A) \cdot P(B|A)$, we have $P(A \text{ and } B) = \frac{1}{5} \cdot \frac{1}{2} = \frac{1}{10}$