

Probability and two-way tables

Choose the correct sample space and calculate simple, joint and conditional probabilities.

	Club	No club
Grade 11	12	8
Grade 12	6	14

Joint: 12 / 40

Given club: 12 / 18

The denominator follows the condition.

Reasoning at a glance

1. Sample space

Probability compares favorable outcomes with all equally likely eligible outcomes. The denominator must match the selection rule.

2. Two-way tables

Rows and columns classify the same people in two ways. Each cell counts an intersection. Totals include each person once.

3. Joint probability

For A and B, use the intersection count as numerator and the overall eligible total as denominator.

4. Conditional probability

Given B, restrict the sample space to B. $P(A \text{ given } B) = \text{count}(A \text{ and } B) / \text{count}(B)$, when $\text{count}(B)$ is positive.

5. Complement and union

$P(\text{not } A) = 1 - P(A)$. For A or B, include either event and subtract their overlap once.

A common error

Among club members means the denominator is club members, not all students.

Prerequisites: Fractions, proportions and reading row and column totals

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