

AP Statistics - Two Categorical Variables and Two-Way Tables - Test Answer Key

Common Core AP STAT 2.1, AP STAT 2.2, AP STAT 2.3, HSS-ID.B.5 · maths-pdf.fr/en/

Each solution is followed by a scoring guide. Give credit for choosing the correct denominator, for the correct percent, and for an interpretation that compares groups in context.

AP Statistics · Common Core State Standards: **AP STAT 2.1, AP STAT 2.2, AP STAT 2.3, HSS-ID.B.5**

Question 1 - Marginal and joint [3 pts]

Sport \ Grade	Grade 9	Grade 12	Total
Plays a sport	45	25	70
No sport	15	65	80
Total	60	90	150

Sports participation.

(a) $\frac{70}{150} \approx 46.7\%$. (b) $\frac{25}{150} \approx 16.7\%$. (c) 60.

46.7%; 16.7%; 60.

Scoring: 1 point per part.

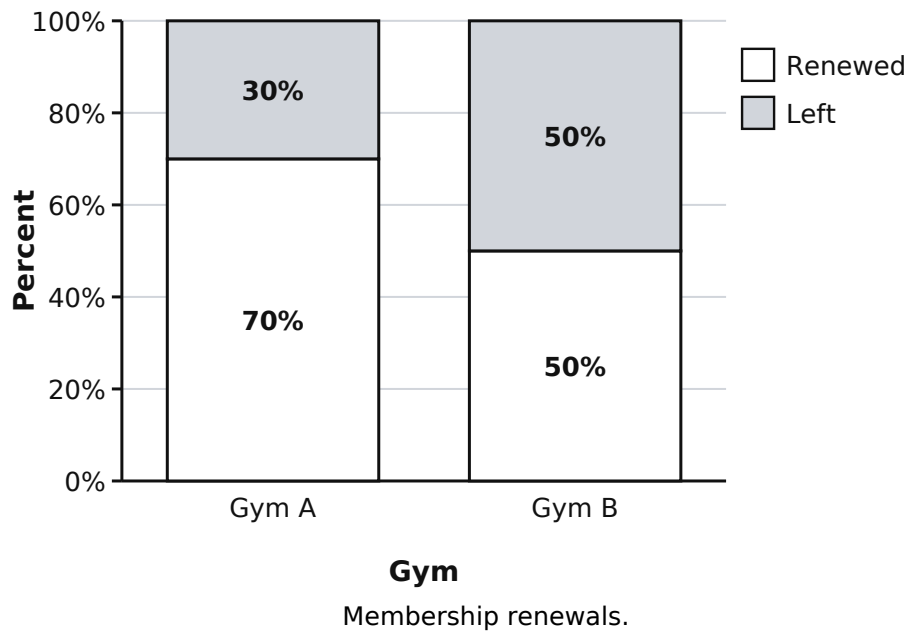
Question 2 - Conditional percents [3 pts]

Grade 9: $\frac{45}{60} = 75\%$. Grade 12: $\frac{25}{90} \approx 27.8\%$.

75% compared with 27.8%. Yes, there is an association: Grade 9 students are much more likely to play a sport.

Scoring: 1 point for each percent; 1 point for the conclusion with numbers.

Question 3 - Segmented bar graph [3 pts]



(a) A: $0.70 \times 300 = 210$. B: $0.50 \times 200 = 100$.

(b) No, an association does not show causation.

210 and 100; no.

Scoring: 1 point for each count; 1 point for the explanation.

Question 4 - Choose the denominator [2 pts]

Seniors: $\frac{18}{90} = 20\%$. Juniors: $\frac{12}{60} = 20\%$.

The percents are equal (20%), so seniors are not more likely to join; there are just more seniors.

Scoring: 1 point for both percents; 1 point for the conclusion.

Question 5 - Simpson's paradox [3 pts]

Overall: A $\frac{84}{100} = 84\%$, B $\frac{47}{100} = 47\%$. Mild: A 90%, B 95%. Severe: A 30%, B 35%.

Hospital A is better overall (84% compared with 47%) but B is better in both severity levels (95% compared with 90%, 35% compared with 30%). Severity is a lurking variable.

Scoring: 1 point for overall rates, 1 point for rates within each group, 1 point for the

explanation.

Question 6 - Complete a table [2 pts]

Grade 11 total: $80 - 50 = 30$. Not in band: $30 - 12 = 18$.

18 students.

Scoring: 1 point for the Grade 11 total, 1 point for 18.

Question 7 - Explain a vocabulary term [2 pts]

A conditional relative frequency is a cell count divided by the total of the group you are given.

Example: among Grade 9 students, $45/60 = 75\%$ play a sport.

Scoring: 1 point for the definition; 1 point for a correct example.

Question 8 - Missing counts [2 pts]

Under 30 in summer: $55 - 30 = 25$.

25 people.

Scoring: 1 point for the setup using the total 55; 1 point for 25.

Total
20 points