

Probability Rules and Conditional Events

Grade 11 – Algebra 2 math · Test Answer Key · Standards: S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7

Each answer shows the rule and the fractions used. Give partial credit for a correct setup with an arithmetic slip, and add the points for a total out of 20.

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Question 1 Union and complement (2 points)

$0.55 + 0.35 - 0.20 = 0.70$. Then $1 - 0.70 = 0.30$. **0.70 and 0.30.**

Scoring: 1 point for each.

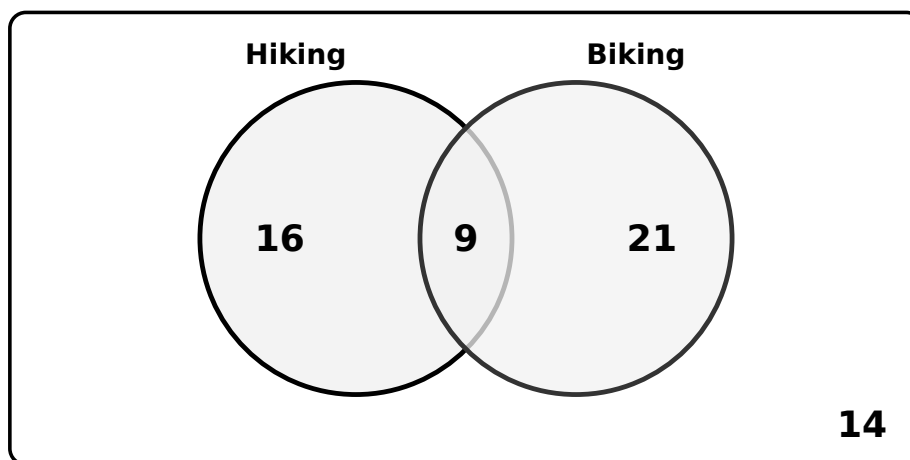
Question 2 Independent or not (2 points)

$0.25 \times 0.8 = 0.20$ equals $P(A \cap B)$, so **they are independent**. $P(A | B) = 0.2/0.8 = \mathbf{0.25}$, equal to $P(A)$.

Scoring: 1 point for the decision with justification, 1 point for the conditional probability.

Question 3 Venn diagram of outdoor activities (3 points)

- $(16 + 9)/60 = \mathbf{5/12}$.
- Biking total = $21 + 9 = 30$, so $9/30 = \mathbf{3/10}$.
- $14/60 = \mathbf{7/30}$.



Hiking total 25, biking total 30.

Scoring: 1 point per part.

Question 4 Gym membership table (3 points)

- a. $67/150$.
- b. $45/83$.
- c. $P(\text{Weights}) = 67/150 \approx 0.447$ but $P(\text{Weights} \mid \text{Morning}) = 22/60 \approx 0.367$, so **not independent**.

Scoring: 1 point per part.

Question 5 Draws without replacement (2 points)

$$6/10 \times 5/9 = 30/90 = \mathbf{1/3}.$$

Scoring: 1 point for the setup, 1 point for the result.

Question 6 Snow and a late bus (3 points)

- a. $0.4 \times 0.6 + 0.6 \times 0.1 = 0.24 + 0.06 = \mathbf{0.30}$.
- b. $P(\text{snow} \mid \text{late}) = 0.24/0.30 = \mathbf{4/5}$.

Scoring: 1 point for (a), 1 point for the numerator, 1 point for the quotient.

Question 7 At least one success (2 points)

The complement is missing all three: $0.2^3 = 0.008$. So $P = 1 - 0.008 = \mathbf{0.992}$.

Scoring: 1 point for the complement, 1 point for the answer.

Question 8 Conditional with dice (2 points)

Sum 9: (3,6), (4,5), (5,4), (6,3), 4 outcomes. With a 4: (4,5) and (5,4). $\mathbf{2/4 = 1/2}$.

Scoring: 1 point for the reduced sample space, 1 point for the answer.

Question 9 Exclusive versus independent (1 point)

No. Exclusive events have $P(A \cap B) = 0$, but independence needs $P(A)P(B) > 0$.

Scoring: 1 point for the answer with a reason.