

Algebra 2 - Conditional Probability and Independence - Test Answer Key

Common Core 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, S-CP.B.8, S-CP.B.9 · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on conditional probability and independence (S-CP.A.1). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

Algebra 2 · Common Core State 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, S-CP.B.8, S-CP.B.9**

Question 1 - Sample space [2 pts]

Sums 10, 11, 12: $3 + 2 + 1 = 6$ outcomes.

$$\frac{6}{36} = \frac{1}{6}.$$

$$\frac{1}{6}$$

Scoring: 1 point for counting the outcomes, 1 point for the probability.

Question 2 - Union [2 pts]

Soccer or track: $10 + 4 + 6 = 20$ students. $\frac{20}{30} = \frac{2}{3}$.

$$\frac{2}{3}$$

Scoring: 1 point for counting 20 students, 1 point for the probability.

Question 3 - Two-way table [3 pts]

	Girls	Boys	Total
Owens a bike	36	24	60
No bike	14	26	40
Total	50	50	100

Totals.

$$P(\text{bike}) = \frac{60}{100} = 0.6. \quad P(\text{bike}|\text{girl}) = \frac{36}{50} = 0.72.$$

The probabilities differ, so the events are not independent.

0.6; 0.72; not independent

Scoring: 1 point for each probability, 1 point for the conclusion (3 points total: 1 + 1 + 1).

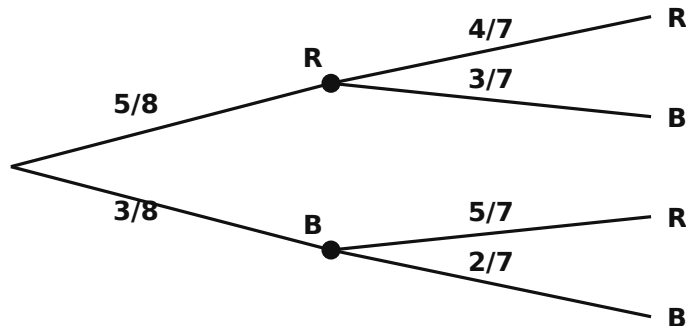
Question 4 - Independence check [2 pts]

$$0.6 \cdot 0.5 = 0.30 \neq 0.35.$$

No, not independent

Scoring: 1 point for the product, 1 point for the conclusion.

Question 5 - Tree diagram [3 pts]



Two draws from a bag of 5 red (R) and 3 blue (B) marbles, without replacement.

$$\text{Red then blue: } \frac{5}{8} \cdot \frac{3}{7} = \frac{15}{56}. \quad \text{Blue then red: } \frac{3}{8} \cdot \frac{5}{7} = \frac{15}{56}.$$

$$\frac{15}{56} + \frac{15}{56} = \frac{15}{28}.$$

$$\frac{15}{28}$$

Scoring: 1 point for each branch, 1 point for the sum.

Question 6 - Counting [2 pts]

a. $P(7,3) = 7 \cdot 6 \cdot 5 = 210$

b. $C(7,3) = \frac{210}{6} = 35$

(a) 210; (b) 35

Scoring: 1 point for each part.

Question 7 - At least one [2 pts]

$$P(\text{no heads}) = \left(\frac{1}{2}\right)^4 = \frac{1}{16}. 1 - \frac{1}{16} = \frac{15}{16}.$$

$$\frac{15}{16}$$

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

Question 8 - Conditional probability [2 pts]

$$\frac{30}{80} = \frac{3}{8}.$$

$$\frac{3}{8}$$

Scoring: 1 point for restricting to the 80 coffee buyers, 1 point for the answer.

Question 9 - Find the error [2 pts]

After the first card is removed, the number of cards left and the chances for the second card change, so the probability of the second event depends on the first. They are dependent.

Without replacement the events are dependent

Scoring: 1 point for stating they are dependent, 1 point for the reason.

Total
20 points