

Algebra 2 - Conditional Probability and Independence - Quiz

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/

Name: _____ Class: _____ Date: ____/____/____

Answer ten multiple-choice questions on conditional probability and independence. Choose one option for each question, then read the explanation to see why the correct choice works and which mistake, such as treating dependent events as independent, each wrong choice shows.

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**

Questions

Question 1

What is $P(\text{not } A)$ if $P(A) = 0.35$?

- A. 0.35
- B. 0.55
- C. 0.65
- D. 1.35

Question 2

What is $P(A \text{ and } B)$ for independent events with $P(A) = 0.5$ and $P(B) = 0.2$?

- A. 0.7
- B. 0.1
- C. 0.3
- D. 0.25

Question 3

First die						
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12
	1	2	3	4	5	6

All 36 outcomes for two dice; the sums of 7 are highlighted.

The highlighted cells show sums of 7. How many of the 36 outcomes have sum 7?

- A. 6
- B. 7
- C. 12
- D. 1

Question 4

Find $P(A \text{ or } B)$ if $P(A)=0.4$, $P(B)=0.3$, and $P(A \text{ and } B)=0.1$.

- A. 0.7
- B. 0.6
- C. 0.12
- D. 0.8

Question 5

	Grade 10	Grade 11	Total
Plays a sport	30	20	50
No sport	50	100	150
Total	80	120	200

A two-way table of counts.

What is $P(\text{plays a sport} \mid \text{Grade 10})$ in the table?

- A. $\frac{3}{80}$
- B. $\frac{3}{20}$
- C. $\frac{1}{4}$
- D. $\frac{30}{200}$

Question 6

In how many ways can 4 runners finish 1st, 2nd and 3rd?

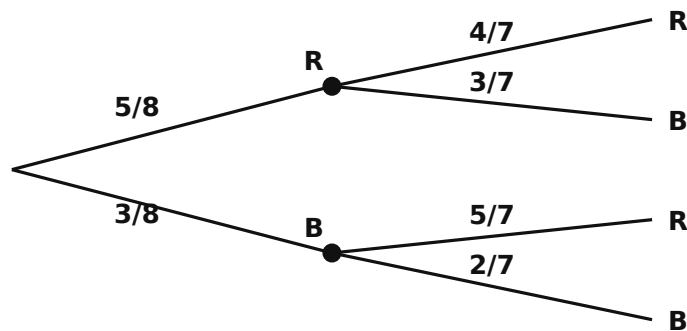
- A. 12
- B. 64
- C. 4
- D. 24

Question 7

How many 2-person teams can be chosen from 6 people?

- A. 30
- B. 12
- C. 36
- D. 15

Question 8



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

From the tree, what is P(both blue) without replacement?

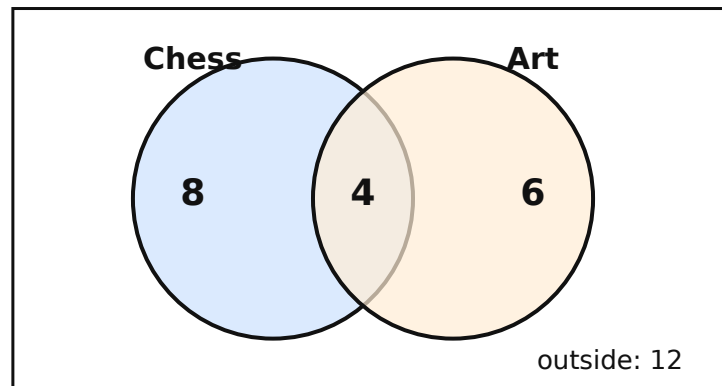
- A. $\frac{9}{64}$
- B. $\frac{3}{8}$
- C. $\frac{3}{28}$
- D. $\frac{6}{15}$

Question 9

Two events are independent when

- A. $P(A \text{ and } B) = 0$
- B. $P(A \text{ and } B) = P(A) \cdot P(B)$
- C. $P(A \text{ or } B) = 1$
- D. $P(A) = P(B)$

Question 10



Venn diagram with counts.

The Venn diagram shows 30 students in chess and art clubs. What is $P(\text{chess or art})$?

- A. $\frac{12}{30}$
- B. $\frac{18}{30}$
- C. $\frac{12}{30}$
- D. $\frac{18}{30} + \frac{10}{30}$

Answers

1. **C** - The complement rule: $1 - 0.35 = 0.65$.
2. **B** - Multiply for independent events: $0.5 \cdot 0.2 = 0.1$.
3. **A** - The diagonal has 6 highlighted cells.
4. **B** - $0.4 + 0.3 - 0.1 = 0.6$. Subtract the overlap.
5. **A** - Restrict to Grade 10: 80 students, 30 play a sport, so $30/80 = 3/8$.
6. **D** - $P(4, 3) = 4 \cdot 3 \cdot 2 = 24$.
7. **D** - $C(6, 2) = 6 \cdot 5 / 2 = 15$. Order does not matter.
8. **C** - $3/8 \cdot 2/7 = 6/56 = 3/28$.
9. **B** - Independence means that knowing one event does not change the probability of the other.
10. **A** - 18 students are in at least one club: $8 + 4 + 6 = 18$, and $18/30 = 3/5$.

Remember

- $P(\text{not } A) = 1 - P(A)$; $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$.
- $P(A \text{ given } B) = P(A \text{ and } B) / P(B)$.
- Independent: $P(A \text{ and } B) = P(A) \cdot P(B)$.
- Multiplication rule: $P(A \text{ and } B) = P(A) \cdot P(B \text{ given } A)$.
- Permutations $P(n, r) = n! / (n - r)!$; combinations $C(n, r) = n! / (r!(n - r)!)$.