

AP Statistics - Probability Rules and Simulation - Quiz

Common Core AP STAT 4.1, AP STAT 4.2, AP STAT 4.3, AP STAT 4.4, HSS-CP.A.1, HSS-CP.B.7 · maths-pdf.fr/en/

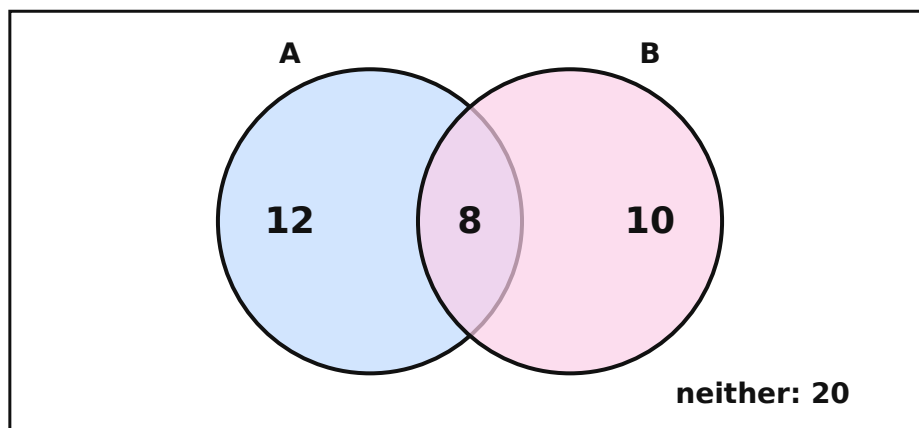
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions check the language of probability and the basic rules. Read each explanation to see which misconception makes a wrong choice look right.

AP Statistics · Common Core State Standards: **AP STAT 4.1, AP STAT 4.2, AP STAT 4.3, AP STAT 4.4, HSS-CP.A.1, HSS-CP.B.7**

Questions

Question 1



Venn diagram of 50 outcomes.

What is $P(A \text{ or } B)$?

- A. 0.4
- B. 0.8
- C. 0.2
- D. 0.6

Question 2

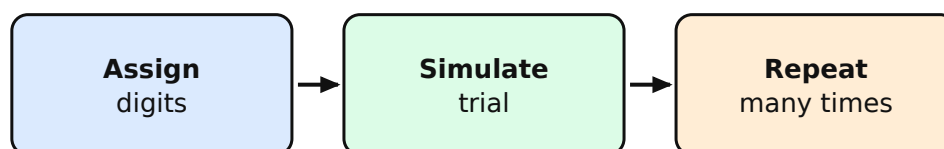
+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Sample space for two dice: 36 equally likely outcomes.

What is $P(\text{sum} = 4)$ for two fair dice?

- A. $1/12$
- B. $1/6$
- C. $1/36$
- D. $1/4$

Question 3



Simulation.

Why are many trials used in a simulation?

- A. The relative frequency gets closer to the true probability
- B. to make the probability larger
- C. to remove all randomness
- D. so the outcomes are mutually exclusive

Question 4

If $P(A) = 0.3$, then $P(\text{not } A)$ is:

- A. 0.3
- B. 0.7
- C. 0.6
- D. 1.3

Question 5

Two events are mutually exclusive. $P(A) = 0.2$ and $P(B) = 0.5$. $P(A \text{ or } B) =$

- A. 0.7

- B. 0.1
- C. 0.3
- D. 0.9

Question 6

A fair coin has landed heads 5 times. The probability of heads on the next flip is:

- A. less than 0.5
- B. greater than 0.5
- C. 0.5
- D. 0

Question 7

A probability can never be:

- A. 0
- B. 1
- C. 1.2
- D. 0.5

Question 8

$P(A) = 0.4$, $P(B) = 0.5$, $P(A \text{ and } B) = 0.2$. $P(A \text{ or } B) =$

- A. 0.9
- B. 0.7
- C. 0.1
- D. 0.2

Question 9

In a bag with 4 red and 6 blue marbles, one is picked. $P(\text{blue}) =$

- A. 0.4
- B. 0.24
- C. 1.5
- D. 0.6

Question 10

A probability of 0 means the event:

- A. is very unlikely but possible
- B. cannot happen
- C. happens half the time
- D. always happens

Answers

1. **D** - $A \text{ or } B = 12 + 8 + 10 = 30$ outcomes of 50, which is 0.6. Adding $P(A)$ and $P(B)$ without subtracting the overlap would give 0.8.
2. **A** - Sums of 4: (1,3), (2,2), (3,1), which is 3 of 36 = $1/12$.
3. **A** - The law of large numbers says estimates improve with more trials.
4. **B** - Complement rule: $1 - 0.3 = 0.7$.
5. **A** - For mutually exclusive events, add: $0.2 + 0.5$.
6. **C** - Flips are independent, so the previous results do not change the next flip.
7. **C** - Probabilities lie between 0 and 1 inclusive.
8. **B** - $0.4 + 0.5 - 0.2 = 0.7$.
9. **D** - 6 of 10 marbles are blue.
10. **B** - Only an impossible event has probability 0.

Remember

- Probability = long-run relative frequency; always between 0 and 1.
- Law of large numbers: more trials bring the relative frequency closer to the probability.
- Complement rule: $P(A \text{ not happening}) = 1 - P(A)$.
- General addition rule: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$; subtract nothing if A and B are mutually exclusive.
- Simulation: assign digits, simulate trials, repeat many times, then estimate.