

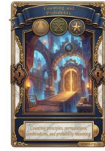
Counting and Probability

Counting principles, permutations, combinations, and probability reasoning.

Name _____ Date _____

32 main 2-up grid 2 pages

Completion Reward



Shown here as a small pack artifact, not a preview destination.

1. When does order matter in a counting problem?

- A. When different arrangements count as different outcomes
- B. When every choice is identical
- C. Only when probability is zero
- D. Never

2. When does order not matter in a counting problem?

- A. When you are choosing a group and arrangement does not matter
- B. When every outcome is impossible
- C. Only for factorials
- D. Only for dice

3. What does probability measure?

- A. Only the number of impossible outcomes
- B. The average of all outcomes
- C. How much of the outcome space supports an event
- D. The number of outcomes minus the number of favorable ones

4. What is $P(\text{not } E)$?

- A. $1 - P(E)$
- B. $P(E) + 1$
- C. $1 / P(E)$
- D. $P(E)^2$

5. If events A and B are independent, how do you find $P(A \text{ and } B)$?

- A. Add $P(A)$ and $P(B)$
- B. Subtract $P(B)$ from $P(A)$
- C. Average them
- D. Multiply $P(A)$ and $P(B)$

6. Which situation is a permutation?

- A. Choosing president, vice president, and secretary
- B. Choosing 3 team members with no jobs
- C. Choosing 2 toppings for a pizza
- D. Choosing a 3-person committee with identical roles

7. Which situation is a combination?

- A. Choosing gold, silver, and bronze medalists
- B. Choosing 3 committee members with no roles
- C. Arranging 4 books on a shelf
- D. Assigning 3 students to 3 different jobs

8. How many outcomes are in the sample space for flipping 2 fair coins?

- A. 2
- B. 4
- C. 3
- D. 8

9. Before deciding on a counting formula, what should you ask first?

- A. What is the derivative?
- B. What is the midpoint?
- C. Can I rotate axes?
- D. Does order matter?

10. If an event is hard to count directly, what is often helpful?

- A. Count its complement first
- B. Square the probabilities
- C. Ignore the sample space and estimate
- D. Assume all outcomes are equally likely without checking

11. A student uses combinations to count gold, silver, and bronze placements. What is wrong?

- A. Placements have order, so permutations are needed
- B. Combinations are always larger
- C. Medals never use counting
- D. Nothing is wrong

12. A student says $P(\text{not } E) = P(E)$. What is wrong?

- A. Complements are impossible to compute
- B. A complement is usually $1 - P(E)$, not the same probability
- C. Complements use multiplication
- D. Nothing is wrong

13. How many ways can 3 different books be arranged on a shelf? Answer with a number.

14. How many ways can you choose 2 students from 5? Answer with a number.

15. How many outcomes are possible when 3 fair coins are flipped? Answer with a number.

16. How many outcomes are possible when 2 fair six-sided dice are rolled? Answer with a number.

17. What is the probability of drawing a heart from a standard 52-card deck? Answer as a simplified fraction.

18. What is the probability of rolling a number greater than 4 on one fair die? Answer as a simplified fraction.

19. If $P(E) = 0.37$, find $P(\text{not } E)$. Answer with a number.

20. What is the probability of flipping heads on a fair coin and then rolling a 6 on a fair die? Answer as a simplified fraction.

21. How many 2-letter arrangements can be made from A, B, C, and D without repetition? Answer with a number.

22. How many 3-person committees can be chosen from 6 people? Answer with a number.

23. What is the probability that two fair dice sum to 7? Answer as a simplified fraction.

24. What is the probability of at least one head in 2 fair coin flips? Answer as a simplified fraction.

25. Write the combination formula for choosing r items from n . Answer as an equation.

26. Write the permutation formula for arranging r items chosen from n . Answer as an equation.

27. Write the complement rule. Answer as an equation.

28. Write the multiplication rule for independent events A and B . Answer as an equation.

29. Write the number of outcomes for n fair coin flips. Answer as an equation.

30. Write the simple-model probability rule for an event E in a fair sample space. Answer as an equation.

31. What is the probability of exactly one head when flipping 2 fair coins?

- A. $1/4$
- B. $1/2$
- C. $2/3$
- D. $3/4$

32. What is the probability of rolling an even number on one fair six-sided die?

- A. $1/3$
- B. $2/3$
- C. $1/2$
- D. $3/6$ only if 6 is rolled