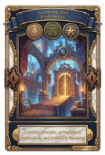
Counting and Probability

Counting principles, permutations, combinations, and probability reasoning.

Name _____ Date _____

32 main · 2-up grid · 11 pages · visible side quests

Completion Reward



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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

1.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

1.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

1.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

1.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

1.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

2.1. Which situation uses a permutation?

A. Choose 3 pizza toppings
B. Assign gold, silver, and bronze medals
C. Pick 4 committee members
D. Choose 2 books to borrow

2.2. Which situation uses a combination?

A. Choosing a president and vice president
B. Arranging 5 books on a shelf
C. Selecting 3 players for a team
D. Creating a 4-digit code

2.3. If P(A) = 0.18, then P(not A) =

A. 0.18
B. 0.72
C. 0.82
D. 1.18

2.4. In sets, A intersection B means:

A. items in A or B
B. items in both A and B
C. items not in either set
D. all items outside the sets

2.5. If 3 of 12 marbles are red, the probability of red is:

A. 1/4
B. 1/3
C. 3/12^2
D. 9/12

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

3.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

3.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

3.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

3.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

3.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

4. What is P(not E)?

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

4.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

4.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

4.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

4.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

4.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

5. If events A and B are independent, how do you find P(A 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)

5.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

5.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

5.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

5.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

5.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

6.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

6.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

6.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

6.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

6.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

7.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

7.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

7.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

7.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

7.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

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

8.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

8.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

8.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

8.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

8.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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?

9.1. Which situation uses a permutation?

A. Choose 3 pizza toppings
B. Assign gold, silver, and bronze medals
C. Pick 4 committee members
D. Choose 2 books to borrow

9.2. Which situation uses a combination?

A. Choosing a president and vice president
B. Arranging 5 books on a shelf
C. Selecting 3 players for a team
D. Creating a 4-digit code

9.3. If P(A) = 0.18, then P(not A) =

A. 0.18
B. 0.72
C. 0.82
D. 1.18

9.4. In sets, A intersection B means:

A. items in A or B
B. items in both A and B
C. items not in either set
D. all items outside the sets

9.5. If 3 of 12 marbles are red, the probability of red is:

A. 1/4
B. 1/3
C. 3/12^2
D. 9/12

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

10.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

10.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

10.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

10.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

10.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

11.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

11.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

11.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

11.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

11.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

12. A student says P(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

12.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

12.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

12.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

12.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

12.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

13.1. Which situation uses a permutation?

A. Choose 3 pizza toppings
B. Assign gold, silver, and bronze medals
C. Pick 4 committee members
D. Choose 2 books to borrow

13.2. Which situation uses a combination?

A. Choosing a president and vice president
B. Arranging 5 books on a shelf
C. Selecting 3 players for a team
D. Creating a 4-digit code

13.3. If P(A) = 0.18, then P(not A) =

A. 0.18
B. 0.72
C. 0.82
D. 1.18

13.4. In sets, A intersection B means:

A. items in A or B
B. items in both A and B
C. items not in either set
D. all items outside the sets

13.5. If 3 of 12 marbles are red, the probability of red is:

A. 1/4
B. 1/3
C. 3/12^2
D. 9/12

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

14.1. Which situation uses a permutation?

A. Choose 3 pizza toppings
B. Assign gold, silver, and bronze medals
C. Pick 4 committee members
D. Choose 2 books to borrow

14.2. Which situation uses a combination?

A. Choosing a president and vice president
B. Arranging 5 books on a shelf
C. Selecting 3 players for a team
D. Creating a 4-digit code

14.3. If P(A) = 0.18, then P(not A) =

A. 0.18
B. 0.72
C. 0.82
D. 1.18

14.4. In sets, A intersection B means:

A. items in A or B
B. items in both A and B
C. items not in either set
D. all items outside the sets

14.5. If 3 of 12 marbles are red, the probability of red is:

A. 1/4
B. 1/3
C. 3/12^2
D. 9/12

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

15.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

15.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

15.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

15.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

15.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

16.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

16.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

16.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

16.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

16.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

17.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

17.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

17.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

17.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

17.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

18.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

18.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

18.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

18.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

18.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

19. If P(E) = 0.37, find P(not E). Answer with a number.

19.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

19.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

19.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

19.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

19.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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.

20.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

20.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

20.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

20.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

20.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

21.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

21.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

21.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

21.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

21.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

22.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

22.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

22.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

22.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

22.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

23.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

23.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

23.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

23.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

23.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

24.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

24.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

24.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

24.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

24.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

25.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

25.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

25.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

25.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

25.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

26.1. If there are 4 shirt choices and 3 pants choices, how many outfits are possible?

A. 7
B. 12
C. 24
D. 1

26.2. When does order matter?

A. when choosing a committee
B. when ranking first, second, and third
C. when picking 2 pizza toppings
D. when choosing a team

26.3. Choosing 3 students to represent a class is a:

A. permutation
B. combination
C. translation
D. sequence

26.4. Choosing president, vice president, and secretary from a club is a:

A. combination
B. permutation
C. set union
D. recursive rule

26.5. There are 2 routes, 4 lunch choices, and 3 activities. How many plans are possible?

A. 9
B. 12
C. 24
D. 36

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

27.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

27.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

27.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

27.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

27.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

28.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

28.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

28.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

28.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

28.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

29.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

29.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

29.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

29.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

29.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

30.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

30.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

30.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

30.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

30.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

31.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

31.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

31.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

31.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

31.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5

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

32.1. A fair die is rolled. What is the probability of rolling an even number?

A. 1/6
B. 1/3
C. 1/2
D. 2/3

32.2. A certain event has probability:

A. 0
B. 1
C. 1/2
D. it depends

32.3. An impossible event has probability:

A. 0
B. 1
C. -1
D. 2

32.4. In a uniform setting, probability compares:

A. favorable outcomes to total outcomes
B. outputs to inputs
C. slope to intercept
D. mean to median

32.5. If P(A) = 0.35, then P(not A) = ?

A. 0.35
B. 0.65
C. 1.35
D. 0.5