

Counting Applications

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

1. From 6 different books, how many sets of 3 books can be selected? Identify the counting method.

Selection policy: No person or item may be selected more than once.

2. A trip has 3 first-leg routes, 6 second-leg routes, and 4 final-leg routes. How many complete routes are possible? Identify the counting method.

Selection policy: Each stage is chosen independently; reusing a category choice does not remove later choices.

Counting Applications

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

3. A club with 12 members fills 3 distinct officer roles. How many assignments are possible? Identify the counting method.

Selection policy: No person or item may be selected more than once.

4. A lunch menu has 5 entrees, 4 sides, and 2 drinks. How many meals choose one of each? Identify the counting method.

Selection policy: Each stage is chosen independently; reusing a category choice does not remove later choices.

Counting Applications

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

5. From 6 distinct toppings, how many selections of 5 different toppings are possible? Identify the counting method.

Selection policy: No person or item may be selected more than once.

6. From 10 speakers, how many ordered schedules of 5 different speakers are possible? Identify the counting method.

Selection policy: No person or item may be selected more than once.

Counting Applications

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

7. A three-position code uses 5, 4, and 3 allowed symbols by position. Symbols may repeat. How many codes are possible? Identify the counting method.

Selection policy: Repetition is allowed, and each position has its stated set of choices.

8. From 12 volunteers, how many different committees of 2 people are possible? Identify the counting method.

Selection policy: No person or item may be selected more than once.

Counting Applications

Worked Answer Key

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

- 1. From 6 different books, how many sets of 3 books can be selected? Identify the counting method.**

Answer: 20 (Combination nCr (order does not matter))

1. Order does not matter and no item repeats, so use $6C3$.
2. $6C3 = 6! / (3!(3!)) = 20$.

- 2. A trip has 3 first-leg routes, 6 second-leg routes, and 4 final-leg routes. How many complete routes are possible? Identify the counting method.**

Answer: 72 (Multiplication principle)

1. The independent choice counts are 3, 6, 4.
2. Multiply: $3 \times 6 \times 4 = 72$.

Counting Applications

Worked Answer Key

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

- 3. A club with 12 members fills 3 distinct officer roles. How many assignments are possible? Identify the counting method.**

Answer: 1320 (Permutation nPr (order matters))

1. Order matters and no item repeats, so use $12P3$.
2. $12P3 = 12 \times 11 \times 10 = 1320$.

- 4. A lunch menu has 5 entrees, 4 sides, and 2 drinks. How many meals choose one of each? Identify the counting method.**

Answer: 40 (Multiplication principle)

1. The independent choice counts are 5, 4, 2.
2. Multiply: $5 \times 4 \times 2 = 40$.

Counting Applications

Worked Answer Key

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

5. From 6 distinct toppings, how many selections of 5 different toppings are possible? Identify the counting method.

Answer: 6 (Combination nCr (order does not matter))

1. Order does not matter and no item repeats, so use $6C5$.
2. $6C5 = 6! / (5!(1)!) = 6$.

6. From 10 speakers, how many ordered schedules of 5 different speakers are possible? Identify the counting method.

Answer: 30240 (Permutation nPr (order matters))

1. Order matters and no item repeats, so use $10P5$.
2. $10P5 = 10 \times 9 \times 8 \times 7 \times 6 = 30240$.

Counting Applications

Worked Answer Key

Identify whether order matters and whether repetition is allowed. Name the counting method, show the factors or formula, and give the exact count.

- 7. A three-position code uses 5, 4, and 3 allowed symbols by position. Symbols may repeat. How many codes are possible? Identify the counting method.**

Answer: 60 (Multiplication principle)

1. The independent choice counts are 5, 4, 3.
2. Multiply: $5 \times 4 \times 3 = 60$.

- 8. From 12 volunteers, how many different committees of 2 people are possible? Identify the counting method.**

Answer: 66 (Combination nCr (order does not matter))

1. Order does not matter and no item repeats, so use $12C2$.
2. $12C2 = 12! / (2!(10!)) = 66$.