

Assignment

Write

1. A _____ is an ordered arrangement of items without repetition.
2. The _____ of n , written as $n!$, is the product of all non-negative integers less than or equal to n .
3. A _____ is an unordered collection of items.
4. The _____ of n objects is $(n - 1)!$

Remember

If the order in which the items in a set matters, then each arrangement is called a permutation. If the order of the items in a set does not matter, then each arrangement is called a combination.

Practice

1. State whether each question uses permutations or combinations. Then calculate the answer.
 - a. The Debate Club contains 13 members. They need to elect 3 members to the executive board: a president, vice president, and secretary. How many different executive boards are possible?
 - b. Quentin used 7 websites during research for a report. How many different ways can he list the websites in his bibliography?
 - c. Tyler has 28 songs on his computer. He is transferring 8 songs to his MP3 player. How many different ways can the songs be chosen?
 - d. Josy is making a pattern with 2 squares, one triangle, and one circle. How many different patterns can Josy make?
 - e. Sydney works at a kennel. She takes the 8 dogs at the kennel out for a walk in groups of 2. How many different groups of dogs can Sydney take?
2. Calculate each probability.
 - a. A field hockey team has 10 members and the coach randomly selects 2 players as captains for each game. What is the probability that coach chooses you and your best friend as captains?
 - b. Germaine has 2 quarters, a nickel, and a penny that he is randomly placing on the table in a line. What is the probability that the order of the coins will be quarter, nickel, penny, quarter?
3. Calculate the number of arrangements.
 - a. How many different 7-digit numbers can be written using the digits 1, 1, 2, 7, 7, 7, 8, and 9?
 - b. How many different ways can the letters in the word GEOMETRY be arranged?
4. Mrs. Rynearson is a kindergarten teacher. She asks her students to sit in a circle. Calculate the number of arrangements for each number of students.
 - a. Four students
 - b. Six students

Stretch

A student is taking a three question true/false quiz. The student only studied a little bit, so she will make educated guesses for each question. The probability she gets each question correct is $\frac{2}{3}$. List all the possible ways the student can answer the questions as well as the probabilities for each. Use C for correct and I for incorrect.

Review

- Giorgio is stopping at a coffee shop on the way to work. The probability that Giorgio has to wait in line and buys a doughnut is $\frac{5}{8}$. The probability that Giorgio has to wait in line is $\frac{7}{10}$. Giorgio buys a doughnut every 40 out of 55 times he goes to the coffee shop.
 - What is the probability Giorgio buys a doughnut given that he waited in line?
 - Are waiting in line and buying a doughnut independent or dependent events? Explain your reasoning.
- In a school, when a student is chosen at random the probability that the student takes physics and chemistry is $\frac{3}{25}$. The probability that the student takes just chemistry is $\frac{3}{5}$, and the probability that the student takes just physics is $\frac{1}{5}$.
 - What is the probability a randomly chosen student takes physics given that they are taking chemistry?
 - Are taking physics and taking chemistry independent or dependent events? Explain your reasoning.
- A game includes a deck of cards with a shape on each card. The table shows the numbers of each type of card. Suppose each time a card is chosen, the card is replaced before another card is chosen. A player draws four cards. What is the probability they will all have a different shape on them?
- A sphere has a volume of 6,367.4 cubic centimeters. Determine the radius of the sphere. Use 3.14 for π and round your answer to the nearest tenth.
- A cone that is 5.5 inches high has a volume of 87.56 cubic inches. Determine the radius of the cone. Use 3.14 for π and round your answer to the nearest tenth.

Number of Cards	Shape on Card
5	triangle
15	square
4	rectangle
6	circle
12	star