WebHW 14 Spring2026 PermsCombs

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Problem 1. **(1 point)**
Evaluate the following expressions:
a) $P(80, 1) =$ _____
b) $P(10, 6) =$ _____
c) $P(11, 3) =$ _____

Problem 2. **(1 point)**
Find the value of each of the following quantities:
$C(12, 1) =$ _____
$C(12, 4) =$ _____
$C(5, 3) =$ _____

Problem 3. **(1 point)**
An experiment consists of choosing a subset from a fixed number of objects where the arrangement/order of the chosen objects is not important. Determine the size of the sample space when you choose the following:

(a) 6 objects from 13

Answer : ____

(b) 5 objects from 26

Answer : ____

(c) 3 objects from 22

Answer : ____

Problem 4. **(1 point)**
In how many ways can 6 students be seated in a row of 6 chairs if Jack insists on sitting in the first chair?
Your answer is : _____

Problem 5. **(1 point)**
There are 9 different positions on a baseball team. If a team has 15 players how many different line-ups can the team make?
The team can make _____ different line-ups.

Problem 6. **(1 point)**
How many ways are there to seat 4 people in a row of 8 chairs? _____

Problem 7. **(1 point)**
How many different ways can a race with 8 runners be completed? (Assume there is no tie.)
Your answer is : _____

Problem 8. **(1 point)**
How many three-letter "words" can be made from 10 letters "FGHIJKLMNO" if repetition of letters
(a) is allowed?
Your answer is : _____
(b) is not allowed?
Your answer is : _____

Problem 9. **(1 point)**
In how many ways can 2 ice cream toppings be chosen from 12 available toppings?
Your answer is : _____

Problem 10. **(1 point)**
In the 6/54 lottery game, a player picks six numbers from 1 to 54. How many different choices does the player have if repetition is not allowed?
Note that the order of the numbers is not important.
Your answer is : _____

Problem 11. **(1 point)**
A pianist plans to play 8 different pieces at a recital. In how many ways can she arrange these pieces in the program?
Your answer is : _____

Problem 12. **(1 point)**
How many ways can 4 CD's be chosen from a case of 10 CDs? ___

Problem 13. **(1 point)**
A secret code for a bank vault consists of 4 letters, then 4 digits and then 4 more letters.

How many different codes are possible?
Answer:_____

How many codes are possible if repeating letters and digits is not allowed?
Answer:_____

How many codes are possible if repeats are not allowed and the first letter must be 'U' and the second digit must be '3'?
Answer:_____

If the wrong code is entered the vault automatically locks and the alarm sounds. Suppose repeating letters and digits are allowed in the code. What is ther probability of a thief breaking into the vault if the thief has no prior knowledge of the secret code?
Answer:_____

Problem 14. **(1 point)**
How many strings of five uppercase English letters are there
(a) if letters can be repeated?

_____

(b) that start and end with an X, if letters can be repeated?

_____

(c) that start and end with the letters BO (in that order), if letters can be repeated?

_____

(d) that start or end with the letters BO (in the order), if letters can be repeated? (inclusive or)

_____

Problem 15. **(1 point)**
If 3 -letter "words" are formed using the letters A, B, C, D, E, F, G, how many such words are possible for each of the following conditions:
(a) No condition is imposed.
Your answer is : _____
(b) No letter can be repeated in a word.
Your answer is : _____
(c) Each word must begin with the letter A and letters can be repeated.
Your answer is : _____
(d) The letter C must be at the end and letters can be repeated.
Your answer is : _____
(e) The second letter must be a vowel and letters can be repeated.
Your answer is : _____

Problem 16. **(1 point)**
A 4-card poker hand is dealt at random from a standard 52-card deck. What is the total number of possible hands?_____
What is the total number of possible hands if the hand contains exactly one heart? _____

Problem 17. **(1 point)**
A boy has 2 red , 4 yellow and 2 green marbles. In how many ways can the boy arrange the marbles in a line if all marbles have different sizes?

_____

Problem 18. **(1 point)**
A boy has 5 red , 5 yellow and 2 green marbles. In how many ways can the boy arrange the marbles in a line if all marbles of the same color are indistinguishable?

_____

Problem 19. **(1 point)**
A boy has 5 red , 3 yellow and 4 green marbles. In how many ways can the boy arrange the marbles in a line if:
a) Marbles of the same color are indistinguishable?

_____
b) All marbles have different sizes?

_____

Problem 20. **(1 point)**
The annual National No Spying Day is celebrated at KAOS headquarters this year. There are 10 Control agents and 16 KAOS agents attending. How many ways can we choose a team of 9 agents if 3 team members need to be from Control and 6 from KAOS?

____
How many ways can we choose a team of 9 agents if at least 1 team member needs to be from Control?

____

Problem 21. **(1 point)**
A bowl contains 5 red balls and 10 blue balls. A woman selects 4 balls at random from the bowl. How many different selections are possible if at least 3 balls must be blue? ____

Problem 22. **(1 point)**
How many anagrams can be created from the word 'needlessly' if the new words do not need to be meaningful?

_____

Problem 23. **(1 point)**
To avoid collisions with invasive species of aliens, new imperial regulations allow only positive integer space jumps parallel to the three space axes defined in the Jedi council's booklet of rules and regulations. How many ways can the Millenium Falcon travel from Earth with coordinates (2,1,1) to the Wookiee smugglers trading place at (5,6,8)? _____

Problem 24. **(1 point)**
Julie owns 8 different mathematics books and 5 different computer science books and wish to fill 5 positions on a shelf. If the first 3 positions are to be occupied by math books and the last 2 by computer science books, in how many ways can this be done? _____

Problem 25. **(1 point)**
You are rearranging your bookshelf to make it more interesting and harder to find anything on it. On one of the shelves you plan to put 12 biographies and 6 mysteries. How many ways can you arrange them on the shelf if you don't want any two mystery books next to each other (i.e. they need to be separated by at least one biography, maybe more...).

_____

Problem 26. **(1 point)**
A vendor sells ice cream from a cart on a sidewalk in downtown Flagstaff, Arizona. He offers 5 different flavors (vanilla, chocolate,...) served on 2 different cones. How many different single-scoop ice-cream cones can you buy from this vendor?
Your answer is : ____

Problem 27. **(1 point)**
Find the number of distinguishable permutations of the given letters "AAABBBCCC".
Your answer is : _____

Problem 28. **(1 point)**
A 5-card poker hand is dealt from a well shuffled regular 52-card playing card deck. Find the probability that the hand is a Royal flush (10, J, Q, K, A all of the same suit).
Answer: ____

Problem 29. **(1 point)**
Seven cards, each containing one of the following letters C, B, T, A, E, M, and H are placed in a hat. Each letter is used only once. Stu will pull four cards out at random and without replacement.

The probability that Stu pulls out M, A, T, H in this order is ____
Express your answer as a fraction (a/b).

Problem 30. **(1 point)**
A computer retail store has 8 personal computers in stock. A buyer wants to purchase 2 of them. Unknown to either the retail store or the buyer, 2 of the computers in stock have defective hard drives. Assume that the computers are selected at random.

(a) In how many different ways can the 2 computers be chosen?

answer: ____

(b) What is the probability that exactly one of the computers will be defective?

answer: ____

(c) What is the probability that at least one of the computers selected is defective?

answer: ____