

Discrete. Spring 20 Problems for Practice for Test 3.

Also study the quizzes, and the previous two exams!

- Given universe  $\mathcal{U} = \{1, 2, 3, \dots, 107\}$ ;  $A = \{7, 9, 10, 21, 25\}$ ; and  $B = \{5, 4, 7, 10, 21\}$ . Find the following:
  - $|\mathcal{P}(A)|$
  - The number of subsets of B of size 3.
  - $|A \cup B|$
  - $|\overline{A \cup B}|$
- How many PIN's are there with 7 digits, no repeated digits?
- How many PIN's are there with 4 digits, no repeated digits, and such that they obey the rule that: either the third digit is 0, the second digit is 2, or the last digit is 1? (more than one requirement can also be true.)
- How many PIN's are there with 3 digits, repeated digits allowed, and such that the first digit is not 0 and the second digit is not 9?
- How many ways can 7 students fill in the first row of 4 seats? (seated in order, leaving 3 students still standing.)
- How many different committees of 4 people can be selected from a group of 10 people?
- How many ways can 3 books be distributed to 7 shelves on a bookcase? (No ordering of the books on the shelves, just a loose pile.)
- How many ways can we plan for 3 books to be placed on a bookcase with 7 shelves? (No books on the shelves yet, just the plan.)
- How many ways are there to put 3 books on the 7 shelves of the bookcase in ordered rows?

10. How many ways can we plan for 3 books to be placed on a bookcase with 7 shelves if at least one book must go on the top shelf? (No books yet, just the plan.)
11. How many ways are there to put 3 books on the 7 shelves of the bookcase in ordered rows if at least one book must go on the top shelf?
12. How many ways can 7 books be distributed to 3 shelves on a bookcase? (No ordering of the books on the shelves, just a loose pile.)
13. How many ways can we plan for 7 books to be placed on a bookcase with 3 shelves? (No books on the shelves yet, just the plan.)
14. How many ways are there to put 7 books on the 3 shelves of the bookcase in ordered rows?
15. How many ways can we plan for 7 books to be placed on a bookcase with 3 shelves if at least two books must go on the top shelf? (No books yet, just the plan.)
16. How many ways are there to put 7 books on the 3 shelves of the bookcase in ordered rows if at least two books must go on the top shelf?