

1.(1 pt) Find the value of the permutation:

$P(7,5) =$ _____

2.(1 pt) Find the value of the combination:

$C(11,4) =$ _____

3.(1 pt) How many 5-digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9? Repeated digits are allowed.

4.(1 pt) How many different 9-letter words (real or imaginary) can be formed from the letters in the word PROFESSOR?

5.(1 pt) Determine the size of the sample space that corresponds to the experiment of tossing a coin the following number of times:

(a) 3 times

answer: _____

(b) 9 times

answer: _____

(c) n times

answer: _____

6.(1 pt) An experiment consists of choosing objects without regards to order. Determine the size of the sample space when you choose the following:

(a) 3 objects from 8

answer : _____

(b) 6 objects from 16

answer : _____

(c) 7 objects from 30

answer : _____

7.(1 pt) Suppose you are managing 18 employees, and you need to form three teams to work on different projects. Assume that all employees will work on a team, and that each employee has the same qualifications/skills so that everyone has the same probability of getting chosen. In how many different ways can the teams be chosen so that the number of employees on each project are as follows:

7, 2, 9

answer : _____

8.(1 pt) 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: _____

9.(1 pt) In how many ways can 3 novels, 2 mathematics books, and 1 biology book be arranged on a bookshelf if

(a) the books can be arranged in any order?

answer: _____

(b) the mathematics books must be together and the novels must be together?

answer: _____

(c) the mathematics books must be together but the other books can be arranged in any order?

answer: _____

10.(1 pt) From a group of 6 women and 8 men a committee consisting of 3 men and 3 women is to be formed. How many different committees are possible if

(a) 2 of the men refuse to serve together?

answer: _____

(a) 2 of the women refuse to serve together?

answer: _____

(a) 1 man and 1 woman refuse to serve together?

answer: _____

11.(1 pt) (a) A particular brand of shirt comes in 14 colors, has a male version and a female version, and comes in 4 sizes for each sex. How many different types of this shirt are made?

(b) How many bit strings of length 7 are there?

(c) How many bit strings of length 7 or less are there? (Count the empty string of length zero also.)

(d) How many strings of 4 lower case English letters are there that have the letter x in them somewhere? Here strings may use the same letter more than once. (Hint: It might be easier to first count the strings that don't have an x in them.)

12.(1 pt) Find how many positive integers with exactly four decimal digits, that is, positive integers between 1000 and 9999 inclusive, have the following properties:

(a) are divisible by 5 or by 7 (inclusive or).

(b) are divisible by 5 and by 7.

(c) are even.

(d) are divisible by 7.

13.(1 pt) How many strings of four decimal digits (Note there are 10 possible digits and a string can be of the form 0014 etc., i.e., can start with zeros.)

(a) begin and end with a 1?

(b) begin with an odd digit? (can repeat digits.)

14.(1 pt) How many strings of five uppercase English letters are there

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

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

(c) if letters can be repeated?

(d) that start with an X, if letters can be repeated?

15.(1 pt) Solve the following two “ union ” type questions:

(a) How many bit strings of length 9 either begin with 3 0s or end with 3 1s? (inclusive or)

(b) Every student in a discrete math class is either a computer science or a mathematics major or is a joint major in these two subjects. How many students are in the class if there are 30 computer science majors (including joint majors), 29 math majors (including joint majors) and 5 joint majors?

16.(1 pt) A bowl contains 6 red balls and 6 blue balls. A woman selects balls at random without looking at them.

(a) How many balls must she select (minimum) to be sure of having at least three blue balls? _____

(b) How many balls must she select (minimum) to be sure of having at least three balls of the same color? _____

17.(1 pt) This question concerns bit strings of length six. These bit strings can be divided up into four types depending on their initial and terminal bit. Thus the types are: 0XXXX0, 0XXXX1, 1XXXX0, 1XXXX1.

How many bit strings of length six must you select before you are sure to have at least 4 that are of the same type? (Assume that when you select bit strings you always select different ones from ones you have already selected.)

18.(1 pt) Find the value of each of the following quantities:

$C(12, 7) =$ _____

$C(10, 7) =$ _____

$C(7, 3) =$ _____

$C(7, 7) =$ _____

$C(7, 3) =$ _____

$C(10, 7) =$ _____

19.(1 pt) There are 4 different candidates for governor of a state. In how many different orders can the names of the candidates be printed on a ballot?

20.(1 pt) How many bit strings of length 12 have:

(a) Exactly three 0s? _____

(b) The same number of 0s as 1s? _____

(d) At least three 1s? _____

21.(1 pt) 15 players for a softball team show up for a game:

(a) How many ways are there to choose 10 players to take the field?

(b) How many ways are there to assign the 10 positions by selecting players from the 13 people who show up?

(c) Of the 15 people who show up, 5 are women. How many ways are there to choose 10 players to take the field if at least one of these players must be women?

22.(1 pt) Suppose that a department contains 12 men and 15 women. How many ways are there to form a committee with 6 members if it must have strictly more women than men?

23.(1 pt) How many ways are there to select 10 countries in the United Nations to serve on a council if 3 is selected from a block of 51, 2 are selected from a block of 69 and 5 are selected from the remaining 69 countries?
