

Name: _____

	Total
Possible	100
Received	

Don't open exam until told to do so.

You will not use a calculator on this exam.
In answering the following questions, not simplify the answers.
For example, leave your answer in the form
 $P(5,3)$ or $12!$ or $C(4,3) \cdot C(7,4)$ or $2^5 - 2^3$ or $7 \cdot 6 \cdot 5$ or ...



For these problems, 5 History books and 4 Novels will be arranged on a shelf.

- /2 How many ways can the books be arranged if there are no special restrictions on the books?

- /4 How many ways can they be arranged if all the History books must be to the left of all Novels?

- /4 How many ways can they be arranged if all the History books must be next to each other (but the Novels do not necessarily need to be together)?

For these problems, 4 artists each have 10 paintings (40 total) to be arranged side by side.

- /2 How many different arrangements are possible if there are no restrictions?

- /4 How many different arrangements are possible if each artist's paintings must be grouped together?

For these problems, 4 couples (4 men, 4 women; 8 persons total) go to a movie together.

- /4 In how many ways can they be seated so that the four men are seated together (side by side) and the four women are seated together?

- /4 In how many ways can they be seated so that they are seated as couples?

- /4 In how many ways can they be seated man/women/man/woman/etc., not necessarily as couples?

- /2 In how many ways can they be seated if there are no restrictions on who sits where?

For these problems, consider the numbers from (and including) 0000 to 9999.

/2 How many numbers are there from 0000 to 9999?

/3 How many numbers are there from 0000 to 9999 in which all four digits are different?

/2 How many numbers are there from 0000 to 9999 in which all four digits are the same?

/5 How many numbers are there from 0000 to 9999 in which three of the digits are the same and the fourth digit is different (e.g. 5535 or ...)

For these problems, you toss a coin eight times.

/2 How many possible outcomes are there?

/3 How many possible outcomes are there in which exactly 2 of the 8 tosses are heads?

/2 How many possible outcomes are there in which none of the coins are heads?

/4 How many possible outcomes are there in which the first and last coins are heads?

/3 Compute $C(20,2)$.

/5 How many even numbers are there between 10,000 and 99,000?

/4 How many three-letter (from A to Z) airport codes are possible? For example: LAX.
Note: there can be repetition.

/5 In how many ways could we divide 15 persons into four groups:
3 groups of 2 persons
1 group of 9 persons.

/4 How many ways can you select 5 stocks from 10 and 3 bonds from 8?

/4 How many ways can you select 4 friends from 10 to give \$1, \$2, \$5 and \$10 to (one bill for each friend)?

For these problems, there are 31 flavors of ice cream. You'll get three scoops.

/2 How many ways to have all three scoops the same flavor?

/3 How many ways to have all three scoops different?

/4 How many ways to have two scoops of one flavor, and one scoop of a different flavor?

For these problems, there is a deck of 90 cards of 9 different colors of cards which are numbered 1 to 10. We will choose 8 cards.

/5 In how many ways can you choose the 8 cards so that we have:

4 of one number

3 of another number

1 of another number?

One example: 2 2 2 2 5 5 5 9

/4 In how many ways can you choose 8 cards so that we have a straight?

One example: 2 3 4 5 6 7 8 9

/4 In how many ways could you have all 8 cards be the same number?

One example: 2 2 2 2 2 2 2 2

Extra credit:

/2 In how many ways can you choose 8 cards so that:

4 of them are an even number of one color

4 of them are an odd number of a second color?