1. Compute the following:

   (a) $C(8, 4)$

   (b) $C(17, 3)$

   (c) $C(20, 5)$

2. In the lottery game Megabucks, it used to be that a person chose 6 out of 36 numbers. The order of the numbers was not important. How many different combinations were possible?

3. Now a person chooses 6 out of 42 numbers in the game Megabucks. The order of the numbers is still not important. How many different combinations are possible?

4. Because of limited funds, 5 research centers are to be chosen out of 8 suitable ones for a study on heart disease. How many choices are possible?

5. A quality control engineer will select 3 of 100 transistors for testing. How many different samples are possible?

6. A snack bar offers strawberries, blueberries, peaches and honey as toppings for ice cream.

   (a) In how many different ways can you choose 2 toppings?

   (b) In how many different ways can you choose 3 toppings?

7. A bipartisan committee of eight people is being formed. The committee must be made up of 5 Democrats and 3 Republicans. If there are 10 Democrats and 5 Republicans to choose from, in how many different ways can this committee be formed?

8. A bag contains 5 purple, 4 red and 3 yellow jelly beans; you take 3 at random. How many of the samples are possible in which the jelly beans are:

   (a) all purple?

(b) all yellow?

(c) 2 purple and 1 yellow?

(d) 2 yellow and 1 purple?

(e) have at least 1 purple?

9. A box of 20 light bulbs contains 5 defective bulbs.

   (a) How many different samples of size 4 are possible?

   (b) How many of these samples contain only good bulbs?

   (c) How many of these samples contain exactly 1 defective bulb?

   (d) How many contain at least 3 good bulbs?

10. A standard deck of cards has 52 cards made of 4 suits, diamonds, hearts, clubs, and spades. There are 13 cards in each suit (ace through king).

    (a) How many different 5-card hands are possible in a standard deck of cards?

    (b) How many of these 5-card hands have 2 Clubs and 3 Diamonds?

    (c) How many of these 5-card hands have all red cards?

    (d) How many of these 5-card hands have at least 4 Hearts?

11. Suppose a woman has 8 different stock certificates, representing holdings in 8 different companies, which she plans to give to her daughters. She plans to give 3 to her oldest daughter, 3 to her middle daughter and 2 to her youngest daughter. In how many ways can she dole out the stock?

12. An artist has created 15 original paintings and she will exhibit some of them in two galleries. Four paintings will be sent to gallery A and 5 paintings to gallery B. In how many ways can this be done?

1. The course coordinator must visit 8 classrooms this quarter to observe the new instructors. In how many ways can she select 3 classes to visit this week?

2. A personnel director for a large corporation has hired ten new engineers. If three positions are open at the Cleveland plant, in how many ways can they be filled if

   (a) they are all different?

   (b) they are all identical?

3. Of the ten engineers hired for the corporation in #2, 6 are men and 4 are women. Five of these engineers are to be chosen to form a grievance committee. In how many ways can the committee be chosen if it must consist of 3 or more men?

4. The MASSASAUGA is a brown and white venomous snake indigenous to North America. Find the number of distinct arrangements of the letters in this word.

5. Judges at an ice-skating competition with 15 contestants must award gold, silver, and bronze medals. In how many different ways can the competition end?

6. The board of directors of a large corporation contains 11 people of whom 6 are men and 5 are women.

   (a) If the board elects a president and a secretary, how many different election outcomes are possible?

   (b) If the board elects four of its members as a delegation to a convention, how many delegations are possible?

   (c) How many of the four member delegations contain at least 2 women?

7. An eight-store chain is ordered by bankruptcy court to go out of business by closing one store every month for the next eight months. In how many different ways can the closings be scheduled?

8. A rent-a-car agency receives an order from a corporation for 2 luxury cars, 3 standard cars, and 4 compact cars. In how many ways can the agency fill this order if it currently has 5 luxury cars, 6 standard cars, and 7 compact cars?

9. A high school teacher is planning to take her senior French class to France for two weeks. They will visit 5 of the following cities: Paris, Chartres, Versailles, Nice, Marseille, Avignon, Lyon, Cherbourg, Bordeaux, and Strasbourg. In how many ways can this itinerary be completed?

10. The Italian alphabet contains 21 letters of which five are vowels. How many 7-letter 'words' can be formed if letters may not be repeated, the 'word' must begin with the letter 'S', and the third, fourth, and last letters must be vowels?

11. Your broker has suggested that you diversify your investments by splitting your portfolio between mutual funds, stocks, and precious metals. She suggests 5 food mutual funds, 8 stocks, and 3 precious metals. Assuming your portfolio is to contain 2 of each type of investment, how many different portfolios are possible?

1. 4-letter words are formed from the letters in the word ARSENIC.
   (a) How many different 'words' of this form can be made?
   (b) How many of these 'words' contain no vowels?

2. The board of directors of a large corporation contains 11 people.
   (a) If the board elects a President, Vice-President, and a Secretary, how many different election outcomes are possible?
   (b) If the board elects three of its members as a delegation to a convention, how many delegations are possible?
   (c) If the board of directors consists of 6 men and 5 women, how many of these delegations contain 2 or more women?

3. First, second, and third prizes are to be awarded at a Science Fair in which 15 exhibits have been entered. In how many different ways can the prizes be awarded?

4. How many 4-digit numbers between 5000 and 9000 can be formed using the digits 3, 4, 5, 6, 7, 8, and 9?

5. The 5-member Senior Week committee is to be chosen from 4 males and 8 females.
   (a) How many different 5-member committees are possible?
   (b) How many different 5-member committees are possible if the committee must consist of 2 males and 3 females?
   (c) How many different 5-member committees are possible if the committee must consist of 4 or more females?

6. How many distinct arrangements are there of the letters in the word MURDERER?

7. The 25 members of the 'I HATE MATH' club are planning an end of quarter party.
   (a) How many different 4-member planning committees are possible?
   (b) How many different 4-member planning committees are possible if the club contains 15 females and 10 males and there must be 2 males and 2 females on the committee?
   (c) How many planning committees are possible if the committee must consist of at least 3 females?

8. A company has 7 junior executives in San Francisco, 6 in Dallas, and 9 in Chicago. It wishes to select 4 junior executives to bring to its headquarters in New York. In how many ways can this be done if:
   (a) 3 of the executives must come from the Chicago office?
   (b) at least 3 executives must come from the Chicago office?
   (c) 2 executives are chosen from the Chicago office and one from each of the other regional offices?

9. How many distinct arrangements of the letters in the word PEPPERONI are there?

10. In how many ways can 8 dancers be arranged in a chorus line?

11. A bipartisan committee of ten people is being formed. The committee must be made up of six Democrats and four Republicans. If there are nine Democrats and six Republicans to choose from, in how many different ways can the Committee be formed?

1. A single die is rolled. Find the probabilities of the following events.
   (a) Rolling a 2
   (b) Rolling an odd number
   (c) Rolling a number less than 5
   (d) Rolling a number greater than 3

2. A card is drawn from a well-shuffled deck of 52 cards. Find the probability of drawing each of the following.
   (a) A 9
   (b) The 9 of hearts
   (c) A heart
   (d) A black 9
   (e) A red card
   (f) A face card

3. The operator of a concession stand at a park keeps track of the kinds of drinks children buy. His records show the following:

DRINK	NUMBER OF CHILDREN
Coca-Cola	150
Fruit Juice	75
Lemonade	275

   What is the probability that a child will buy lemonade?

4. The following table summarizes the responses to the question, "Do you personally know anyone, living or dead, who has been infected with AIDS?"

	YES	NO	TOTALS
Male	245	201	446
Female	228	356	684
Totals	473	557	1,030

   What is the probability that a person in the survey
   (a) is a female?
   (b) is a male who does not know anyone infected with AIDS?

5. During practice, a basketball player shoots 3 free throws that he either hits, (H) or misses (M).
   (a) Draw the tree diagram.

   (b) List the elements in the sample space.
   (c) Find the probability that
      i. he misses the third shot.
      ii. makes at least one free shot.

6. The letters in the word CAR are each written on a tile and placed in a hat. An experiment consists of reaching into the hat, pulling out one tile, and noting the letter. The experiment continues until all the tiles are drawn.

   (a) Draw the tree diagram.

   (b) List the elements in the sample space S.

   (c) Find the probability that

      i. the letter 'A' is selected second.

      ii. CAR is the outcome.

7. Suppose that 40 balls numbered 1 to 40 are placed in a box. After mixing, one ball is selected at random from the box. Find the probability that the number on the ball is divisible by 5.

8. A coin is tossed three times.

   (a) Draw the tree for this experiment.

   (b) List the elements in the sample space S.

   (c) What is the probability:

      i. exactly two heads will show up?

      ii. three tails will show?

      iii. a head will appear on the first flip?

      iv. at least one tail will show?

9. What is the probability you will be dealt 2 aces from a standard 52-card deck?