COUNTING PROBLEMS 1

Name:

1. How many even 3-digit positive integers can be written using the digits 1, 3, 4, 5, and 6?

2. In how many different ways can a 8-question true-false test be answered:
   a) if every question must be answered?

   b) if it is all right to leave questions unanswered (i.e. answer true, false, or leave blank)?

3. In how many ways can you select 4 cards, one after the other, from a 52-card deck:
   a) if the cards are returned to the deck after being selected?

   b) if the cards are not returned to the deck after being selected?

4. How many 7-digit phone numbers can be created if the first digit cannot be 0 or 1, the second must be a 5, and the third must be a 3 or 4?

5. Four cards numbered 1 through 4 are shuffled and 3 different cards are chosen one at a time without replacement. Make a tree diagram showing the various possible outcomes.

COUNTING PROBLEMS 2 Name:

6. How many license plates of three symbols (letters and digits) can be made using at least 2 letters each?

7. In how many ways can 11 books be arranged on a shelf:
   a) using all the books?

   b) using 4 of the books?

8. A sample of 4 Ipods taken from a batch of 100 Ipods is to be inspected. How many different samples can be selected?

9. In a group of 10 people, each person shakes hands with everyone else once. How many handshakes are there?

10. In how many ways can 4 people be seated in a row of 12 chairs?

11. In how many ways can a committee of 7 be chosen from 9 girls and 8 boys if
   a) all are equally eligible?

   b) the committee must include 4 girls and 3 boys?

COUNTING PROBLEMS 3

Name:

12. How many different 6-character license plates can be made with the first three characters as letters and the last three as digits
    a) with repeats

    b) without repeats

13. In how many ways can the letters in the word
    a) PERU be arranged?

    b) CANADA be arranged?

14. How many 7-card hands can be dealt having
    a) exactly 3 aces?

    b) exactly 3 of a kind?

15. How many even 3-digit positive integers can be written using the digits 1, 2, 4, 7, and 8?

16. In how many ways can up to 4 students be selected from 6 girls and 7 boys if each selection must have an equal number of girls and boys?

17. Simplify: ${}_{n+2}P_n$

COUNTING PROBLEMS 4 Name:

18. How many 13-card hands having exactly 10 from any suit be dealt?

19. A high school baseball coach must decide on the batting order for a team of 9 players.
    a) How many different batting orders are possible?

    b) How many batting orders are possible if the pitcher bats last?

    c) How many different batting orders are possible if the pitcher bats last and the team's best hitter bats 3rd?

20 How many 3 digit numbers contain no 7s?

21. How many 3-difit numbers contain at least one seven?

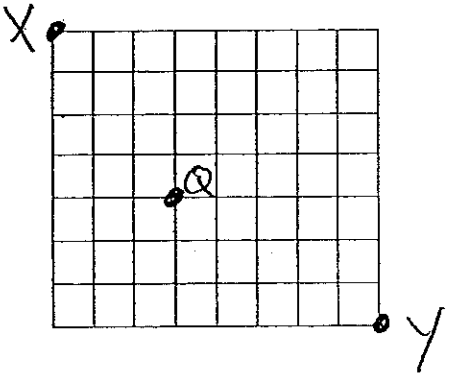
28. Three couples go to the movies and sit together in a row of 6 seats. In how many ways can these people arrange themselves if each couple sits together?

29. A person bicycles along the city streets shown in the figure at right by always traveling south and east. Find the number of possible routes from:
    a) X to Y

    b) X to Q

    c) Q to Y

    d) X to Y via Q



31. Three door prizes are to be given to 3 lucky people in a crowd of 100.
    a) If the three prizes are identical, in how many ways can this be done?

    b) If the three prizes are different (1st , 2nd, and 3rd), in how many ways can this be done?

COUNTING PROBLEMS 5

Name:

32. A track coach must choose a 4-person 400 m relay team and a 4-person 800 m relay team from a squad of 7 sprinters, and of whom can run on either team. If the fastest runner sprints last in both races, in how many ways can the coach form the two teams if each of the 6 remaining sprinters runs only once and each different order is counted as a different team?

33. If you have five signal flags and can send messages by hoisting one or more of them on a flag pole, how many messages can you send?

34. Baskin Robbins has 31 flavors. How many two scoop cones can be made if order is important and flavors cannot be repeated?

35. How many three scoop cones are possible if flavors can be repeated?

36. A town council consists of 8 members including the mayor.
    a. How many different committees of 4 can be chosen from this council?

    b. How many of these committees include the mayor?

    c. How many do not include the mayor?

    d. Relate the above to Pascal's Triangle.

COUNTING PROBLEMS 6 Name:

37. How many ways can 8 jackets of different styles be hung
    a. a straight bar?

    b. on a circular rack?

38. There are three roads from town A to B, 5 roads from town B to town C, and 4 roads from town C to town D. How many ways are there to go from A to D via B and C?

39. If you have a$1 bill, a $5 bill, a $10 bill, and a $20 bill, how many different sums of money can you make using one or more of these bills?

40. Meaty Pizza Dude offers the following toppings: pepperoni, sausage, beef, ham, and anchovies. How many different pizzas can be made?

41. A railway has 30 stations. On each ticket, the departure station and the destination station are printed. How many different tickets are possible?

42. If a ticket can be used in either direction between two stations, how many tickets are needed?

43. A hiker would like to invite 7 friends to go on a trip but only has room for 4 of them. In how many ways can they be chosen?

44. If there were room for only 3 friends, how many ways ways could they be chosen? How is your answer related to #43 and why?