MA 110 Homework 3

This homework assignment is to be written out, showing all work, with problems numbered and answers clearly indicated. If you feel that you must make assumption(s) not stated in the problem in order to solve it, then state your assumption(s). The assignment is due to be handed in by 8:00 AM, Thursday, Nov. 9. Late assignments will not be accepted after the key is posted.

Table 3.1

Table 3.1 describes the small country Mallosistra with four states and populations as shown.

State	Ariza	Birma	Culpa	Doma	Total
Population	20,072	7,568	2,840	1,520	

1. Determine a Jefferson's Method apportionment of the seats in the legislature with 160 seats.
2. Determine an Adams' method apportionment of the seats in the legislature with 160 seats.
3. Determine a Webster's Method apportionment of the seats of the legislature with 160 seats.
4. Redo problems 1-3 with 164 seats in the legislature.
5. Determine a Jefferson's Method apportionment of the seats in the legislature with 10 seats, but each state must get at least one seat.
6. Determine an Adam's Method apportionment of the seats in the legislature with 10 seats, but each state must get at least one seat.
7. In the apportionments of problems 1-6, state whether or not a violation of the quota occurred, which state(s), and if it was a violation of the upper quota or of the lower quota.
8. How many ways are there for a litter of four kittens to consist of at least two males? List all the possibilities.
9. A license plate consists of three letters (AB…YZ) and four digits (01..89).
    a. How many license plates of this sort are there?
    b. How many license plates are there if no letter can be repeated?
    c. How many license plates are there that start with A, B, or C?
    d. How many license plates are there with no Z in them?
    e. How many license plates are there in which the number part does not begin with a string of zeros?
    f. How many license plates are there in which a digit is repeated three times?
    g. How many license plates are there in which no digit is repeated three times?
10. A restaurant offers a fixed price meal. You may choose either a soup or a salad, a main course, and three different vegetables.
    a. How many different meals are possible if there are 4 soups, 3 salads, 5 main courses, and 7 vegetables to choose from?
    b. How many different meals are possible if, in addition to the above meals, you may have soup and substitute a salad for one of your vegetables?

11. Seven friends ABCDEFG line up to buy tickets for a movie. How many different orders are there in which they may line up? How many different orders are there if A and F are always in line together?

12. Seven friends ABCDEFG sit at a round table for dinner. How many different (circular) orders are there in which they may sit together?

13. A survey of 1000 subscribers to the *Los Angeles Times* revealed that 900 people subscribe to the daily Morning edition and 500 subscribe to both the daily and the Sunday editions. How many subscribe to the Sunday edition? How many subscribe to the Sunday edition only?

14. Alice and Dan go to dinner and a play each Saturday night. If there are 7 restaurants in town and 4 playhouses, how many different dates can they have before they repeat? How would the answer be different if 2 of the restaurants were dinner theaters (that is, also playhouses)?

15. A middle school Spanish club has 18 members, 8 boys and 10 girls. Answer the following:
    a. How many ways can a committee of four be chosen? (Assume order doesn't matter.)
    b. Now suppose the first person picked will be chair of the committee?
    c. Suppose instead the committee must be evenly divided between boys and girls?
    d. Suppose instead that the committee cannot consist of all boys nor all girls?

16. Six names ABCDEF are written on separate slips of paper and put in a jar.
    a. How many ways are there to select three different names randomly from the jar if order matters?
    b. How many ways are there to select three different names randomly from the jar if order doesn't matter?
    c. In how many ways are there to select three slips from the jar, if the slips are replaced after choosing each of them? (Assume order matters.)
    d. In how many ways are there to select three slips from the jar, if the slips are replaced after choosing each of them? (Assume order doesn't matter.)

17. Three fair coins are tossed at one time.
    a. What is the probability that they all come up heads?
    b. What is the probability that exactly two come up heads?
    c. What is the probability that at most two come up heads?
    d. What is the probability that at least two come up heads?

18. A fair six-sided die is rolled.
    a. What is the probability that a 6 shows up?
    b. What is the probability that an even number shows up?
    c. What is the probability that either a 1 or a 2 shows up?

19. A jar contains two red marbles and four white marbles. A marble is drawn from the jar at random.
    a. What is the probability that the marble drawn is red?
    b. What is the probability that the marble drawn is white?
    c. What is the probability that the marble drawn is nether red nor white?
    d. What is the probability that the marble drawn is either red or white?