Math 6
Worksheet 1
Due Monday April 5

Please discuss the following questions with your assigned groups. You may take notes on all items you discuss with your classmates, however you are to write up your solutions independently of one another and without assistance. Your solutions should be written up carefully and neatly on a separate sheet of paper. You should write in **complete sentences** and explain all steps taken and tools used (such as theorems or results from class) in reaching your final answers. Please also include at the top of your write-up a list of people with whom you discussed these problems.

1) One section of an exam has five true/false questions.
   (a) How many different ways are there to complete the exam?
   (b) How many ways are there to complete the exam that have no correct answers?
   (c) How many ways are there to complete the exam that have exactly one correct answer?
   (d) How many ways are there to complete the exam that have exactly two correct answer?
   (e) How many ways are there to complete the exam that have at most two correct answers?
   (f) Express the number of ways to complete the exam with at least three correct answers in terms of the above answers.

2) In how many ways can four brother/sister pairs (that is, eight people) attending a concert be seated in a row of eight seats if:
   (a) there are no restrictions?
   (b) each pair of siblings is seated together?
   (c) all the men are seated together and all the women are seated together?
   (d) all the women are seated together?
   (e) men and women alternate?

   After the concert, the four pairs go out to dinner and are seated at a round table. Two seatings are considered the same if each person has the same neighbors. How many ways are there to seat the pairs if:
   (f) there are no other restrictions?
   (g) each pair of siblings is seated together?
   (h) not every pair of siblings is seated together? (that, is there is at least one pair of siblings that is not sitting together.)

3) You have a bag containing 15 marbles. Of these, eight are red, four are blue, and three are green. You select a sample of five marbles.
    (a) How many different samples are possible?
    (b) How many samples will contain only red marbles?
    (c) How many samples will contain one red, two blue, and two green marbles?
    (d) How many will contain at least three blue marbles?

    Select a sample of three marbles.
    (e) How many of these samples will have more green marbles than red or blue?