MATH 367, fall 98
PROJECT 2
Due: Tues Dec 1

NAME:

BIRTHDAY PROBLEMs

It's Friday night and people start arriving, one by one, to the Ballroom for the monthly Swing Dance. Tonight the *Blues Kings* are playing. Curiosity unsettles Mary Jane, a regular at the dance. Today is her birthdate and wonders if there is anybody else in the room with her same birdate. She wants to know how often coincidence of birthdates are likely to happen. She would settle with knowing at leat what is the expected number of people that should be in the ballroom so that there are at least two people with the same birthdate.

Your tast is to help her elucidate these questions.

(a) What is the probability that if the ballroom has n people, there is another person in the room with Mary Jane's birthdate? How large should n be so that this probability is at least $1/2$?

(b) What is the expected number of people that should be in the ballroom so that there are at least two people with the same birthdate?

(c) Are you surprised with your answer? Yes, no. Explain why.

(d) One may be curious as to what are the chances that in the ballroom there are two people with the same birthdate. Give a formula for the probability that in a group of n people, there are at least two people with the same birthdate.

(e) Compute the formula in item (d) when n varies from 20 to 30. Does it throw any light on the answer you got in (b)? Explain.

Note: You may want to use a computer program like **Maple** to do the calculations. If you need help with **Maple**, come talk to me.

Instructions for people registered for the Z-section:
You have to first solve the problem and then write up the explanation of your solution as if you where explaining it to a person who has not thought in mathematical terms in a long time. That is, you have to write a detail explanation of your solution in your own words and in simple terms.

As before, the format of your project should be:

(a) statement of problem,
(b) discussion of the solution, and
(c) conclusion.