Craps/Roulette Worksheet

How much can you expect to lose per hour if you play craps? Let's try to estimate this. *Some* of the data we need to know, or assume is:

1. How much are you betting and what kinds of bets are you placing. Choose something here that you feel will cost you the least per hour. But keep in mind that we are assuming you ARE playing the game!

2. How many rolls per hour should you assume are taking place? You might want to search on-line for data on this.

3. How many rolls does it take, on average, to complete a Pass Line bet? To do this, you will need to answer these questions:

   (a) If you roll a pair of dice until you either get a sum of 4 or a sum of 7, and then stop, what is the expected number of rolls you will make?

   (b) If you roll a pair of dice until you either get a sum of 5 or a sum of 7, and then stop, what is the expected number of rolls you will make?

   (c) If you roll a pair of dice until you either get a sum of 6 or a sum of 7, and then stop, what is the expected number of rolls you will make?

   A more general question that would answer all three of the above, is

   Suppose you repeatedly perform an experiment with chance of success equal to p (and hence chance of failure equal to $1 - p$.) Assume each time you perform the experiment, the results are independent. If you keep performing the experiment until you succeed, at which point you stop, what is the expected number of times you will perform the experiment, in terms of p?

   For example, suppose you flip a coin until you get heads. Here $p = 0.5$. Or, perhaps you roll a pair of dice until you either get a sum of 5 or 7. What is p in this case?

   You might want to first think in broad terms about how the answer depends on p. For example, what happens as p gets closer to 1, or closer to zero? Maybe this will help you guess at the formula and then you can go about trying to prove you are right.

4. An easier question is: How much can you expect to lose per hour playing roulette? Work this out too, making some assumptions that you think are reasonable. Again, you need to know how many spins take place in an hour. Looking on-line might be a good place to find a reasonable figure for this. Finally, which is a cheaper form of entertainment? How do Craps and Roulette compare to going to a movie? To dinner? To a concert?

5. Form groups of three classmates and write this up *nicely* as a group and turn in a *rough draft* on Monday, October 11. Your solution should be well-written! Use full english sentences, etc. You may assume your reader knows a little probability and mathematics, but try to write something that would stand the test of being understandable to a student not in this class. I'll give you some feedback and then you can rewrite it *beautifully*.