Math 21 Binomial/Poisson Group Assignment

1) Ninety-five percent of all Americans have a cellular phone. If 10 Americans are selected at random, find the probability that 9 of them have a cellular phone.

2) 28% of the North Americans who have taken a cruise in the past five years were senior citizens. If twelve North Americans who have taken a cruise in the last five years are selected at random, find the probability that at least one of them was a senior citizen.

3) During a typical day at the Student Health Center, 4.2 students will come in complaining of stomach problems. Find the probability that 5 students will visit the center today to complain about stomach problems.

4) 56% of all licensed drivers admit to running red lights. If eight licensed drivers are selected at random, find the probability that at least three do not admit to running red lights.

5) On a typical day, 6 cats are brought in to a low-cost clinic to be spayed. If the clinic only has enough supplies to spay 8 cats, find the probability that this will not be enough for today.

6) A study revealed that 60% of 18- to 25-year-olds had drunk alcohol in the past thirty days. If twenty 18- to 25-year-olds are selected at random, find the probability that between 9 and 15 of them have drunk alcohol in the past thirty days.

7) The number of students absent from a statistics class follows a Poisson distribution with a mean of 3 students absent per day (not including test days).
a) Find the probability that no students are absent on a given day.
b) Find the probability that 2, 3 or 4 students are absent on a given day.
c) Find the probability that 6 or more students are absent on a given day.

8) The number of runs scored by a college baseball team follows a Poisson distribution with a mean of 4.4 runs per game. Find the probability that the team scores exactly 10 runs in the next two games.

9) A couple plans to have five children. Find the probability that they have at least one boy.

10) A 1999 survey of teachers by USA TODAY revealed that 85% of teachers had not encountered a student with a knife, gun or other deadly weapon in the last three years. If thirty teachers are selected at random, find the probability that at least two teachers had encountered a student with such a weapon in the last three years.

11) The number of teachers absent at an elementary school follows a Poisson distribution with a mean of 0.3 absences per day. If the school has 2 substitute teachers available, find the probability that the school will be understaffed on a given day.

12) The probability that a high school student who takes the SAT has a combined score of 1290 or higher is 0.1. If 15 high school students who took the SAT are randomly selected, find the probability that between 2 and 5 students scored 1290 or above, inclusive.

13) An instructor gives a six-question multiple-choice quiz. There are four possible answers for each question, of which only one is correct. A student must answer at least five questions correctly to pass the quiz. If a student randomly guesses on all six questions, find the probability that he passes the quiz.

14) For a typical flight from Las Vegas to New York, 3 travelers don't show up. If the airline overbooked a flight by 5 passengers during advance sales, find the probability that they will have enough seats for this flight.