

## CSE 312 - Section 6

### Poisson

1. If electricity power failures occur according to a Poisson distribution with an average of 3 failures every twenty weeks, calculate the probability that there will be more than one failure during a particular week.
2. A company makes electric motors. The probability an electric motor is defective is 0.01. What is the probability that a sample of 300 electric motors will contain exactly 5 defective motors? Do it first exactly, then approximate it with the Poisson. How good was the approximation?
3. An average page in a book contains one typo. What is the probability that there are exactly 8 typos in a given 10-page chapter?

### Super Cool Puzzles!

4. A plane has 100 seats and 100 passengers. The first person to get on the plane lost his ticket and so he doesn't know his assigned seat, so he picks a seat uniformly at random to sit in. Every remaining person knows their seat, so if it is available they sit in it, and if it is unavailable they pick a uniform random remaining seat. What is the probability the last person to get on gets to sit in his own seat?
5. Suppose you're on a game show, and you're given the choice of three doors. Behind one door is a car, behind the others, goats. You pick a door, say number 1, and the host, who knows what's behind the doors, opens another door, say number 3, which has a goat. He says to you, "Do you want to pick door number 2?" Is it to your advantage to switch your choice of doors?
6. You flip a fair coin independently and count the number of flips until the first tail, including that tail flip in the count. If the count is  $n$ , you receive  $2^n$  dollars. What is the expected amount you will receive? How much would you be willing to pay at the start to play this game?