

- 1) Network blackouts are unexpected rare events occurring according to a Poisson process at an average rate of 4 per year. Find
- a) (1 point) the probability of at least one blackout occurring during any six months;
 - b) (1 point) if each blackout costs \$150 in computer assistance, the average total cost due to blackouts during a period of four months.
- 2) In a certain political party, where all members run for public office every election cycle, a politician who won is 70% likely to win again, while a politician who lost, is going to win with probability 0.4. Mr. X is the young mayor of a city. Compute
- a) (1.5 points) the probability that he will be a winner two election cycles from now;
 - b) (1.5 points) the probability that he will be a loser in an election in 40 years time (assuming he will live that long and will run for election).
- 3) (2 points) A computer lab has two printers. Printer I handles 60% of the jobs and its printing time is Uniformly distributed between 1 and 3 minutes. Printer II handles the remaining 40% of the jobs and its printing time is Uniformly distributed between 1 and 5 minutes. Let X be the printing time for a document. Explain how to generate the random variable X .
- 4) People come to get snacks from a vending machine according to a Poisson process at the rate of 20 customers per hour. Service times are Exponential, the average service taking 2 minutes. Compute
- a) (1 point) the proportion of time when there is at least one customer waiting in line to get snacks;
 - b) (1 point) the expected time between arrival and departure and the average waiting time of a customer.