

## Homework 16: The Exponential Distribution

1. Suppose that commercial airplanes crash in a certain country at the rate of 2 per year.
  - (a) What is the probability that four or more crashes will occur next year?
  - (b) What is the probability that the next crash will occur between six and ten months from now?
  - (c) What is the probability that the next two crashes will occur within two months of one another?
2. On average, a component in a certain machine lasts for 3 years.
  - (a) Find the probability that a component lasts at least 4 years.
  - (b) Suppose that the machine contains 6 of these components. Find the probability that 4 components last at least 3 years each, assuming that the components operate independently of each other.
3. On average, a hard drive will work for 6 years before breaking down. If a person buys a new computer, what is the probability that the hard drive will still be working after 6 years? Solve this problem in two ways: (a) by using a Poisson random variable, and (b) by using an exponential random variable.