

Review for midterm 1

① Given that 12 airplanes crash in a year, and that the probability that any given crash is equally likely to occur in any month, what is the probability that there is exactly 1 crash each month?

② A batch of 50 items contains 10 defective items. Suppose 10 items are selected at random and tested. What is the prob. that exactly 5 of the items tested are defective?

③ A production line yields two types of devices. Type 1 devices occur with prob. α and work for a relatively short time that is geometrically distributed with parameter r . Type 2 devices work much longer, occur with prob. $1-\alpha$ and have a lifetime that is geometrically distributed with parameter s . Let X be the lifetime of a random device. Find the p.m.f. of X . ②

④ The # N of queries arriving in t seconds at a call center is a Poisson R.V. with $\alpha = \lambda t$, where λ is the average arrival rate in queries/second. Assume that the arrival rate is four queries per minute.

• Find Prob. of > 4 queries in 10 seconds.

• Find the prob. of < 5 queries in 2 minutes.

⑤ Find $E[X^2]$ of a binomial random variable with parameters n (# Bernoulli trials) and p (prob. of success). ③