

Math 254 Practice Problems Part II

1. A busy web server receives an average of 2 requests per second. What is the probability that the server receives at least 5 requests in the next 3-second period? Round your answer to three decimal places.
2. Three cards are drawn simultaneously from a standard deck. Let X represent the number of spades chosen. Find the probability distribution of X . Round your probabilities to three decimal places.
3. A multiple choice test has 150 questions, each of which has five possible answers. A student randomly guesses the answer for each question. Estimate the probability that the student gets between 15 and 25 answers correct (inclusive).
4. The exponential random variable X has probability density function $f(x) = 4e^{-4x}$. Find $P(X > 4.5|X > 3)$. Round your answer to three decimal places. Hint: recall that $P(A|B) = \frac{P(A \cap B)}{P(B)}$.
5. We want to estimate a population proportion with a 99% margin of error at most 0.05. We have no information about the sample proportion. What is the minimum sample size we can use when collecting the sample data?
6. Two percent of all parts produced today are defective. A random sample of 400 parts is selected. Find the probability that between 6 and 9 of the sampled parts (inclusive) are defective.
7. Test whether $p_1 < p_2$ at the 5% significance level given the following sample data: $n_1 = 200, \hat{p}_1 = 0.06, n_2 = 300, \hat{p}_2 = 0.08$.
8. We are testing $H_0 : \mu = 200$ versus $H_a : \mu \neq 200$ at significance level 5%. A sample of 64 measurements yielded a sample SD of 16. Find the probability that we don't reject H_0 if it is known that the true value of μ is 205.