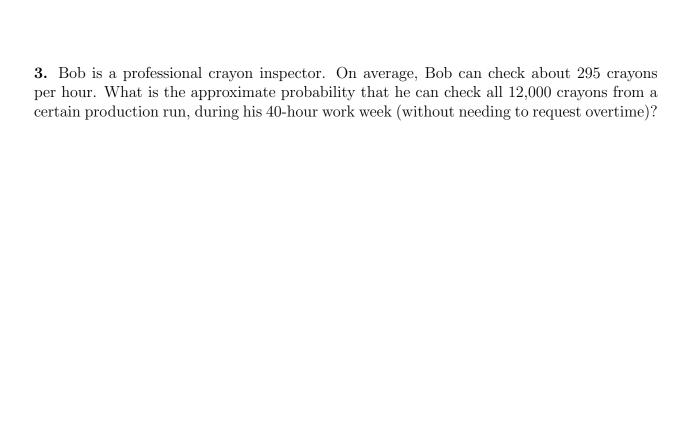STAT/MA 41600
Practice Problems #3: November 14, 2014

1. Suppose that the number of Roseate Spoonbills (a very rare bird in Indiana) that fly overhead in 1 hour has a Poisson distribution with mean 2. Also suppose that the number of Roseate Spoonbills is independent from hour to hour (e.g., the number of birds between noon and 1 PM does not affect the number of birds between 1 PM and 2 PM, etc.).

During 40 hours of observation, what is the approximate probability that 75 or more Roseate Spoonbills are seen?

2. As you know, Dr. Ward likes to be extremely careful with his writing, but alas we are all human, so tiny errors do occasionally appear. As in Problem Set 17, Question 2, suppose that Dr. Ward has an average of only 0.04 errors per page when writing (i.e., approximately 1 error every 25 pages).

If Dr. Ward will write 6000 pages of text during his entire life as an author, what is the approximate probability that he will make strictly less than 230 errors altogether in his lifetime of publications?

3. Bob is a professional crayon inspector. On average, Bob can check about 295 crayons per hour. What is the approximate probability that he can check all 12,000 crayons from a certain production run, during his 40-hour work week (without needing to request overtime)?

4. Customers arrive at a round-the-clock gas station, with an average rate of 8 per hour. During a full week (which is 168 hours), what is the approximate probability that between 1300 and 1400 customers (inclusive) will arrive at the gas station?

5. Dr. Ward's wife writes novels and short stories. Suppose that she plans to write 10,000 pages during her lifetime. She has an average of only 0.025 errors per page when writing (i.e., approximately 1 error every 40 pages).

What is the approximate probability that Dr. Ward's wife makes strictly fewer errors than him, during their entire lives?