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18.440 Probability and Random Variables
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18.440 problem set 4

Problems 1-3 from Ross are from the 7th or 8th Ed.

1. Chap. 4, Problem 36 (or 4.36).
2. Chap. 4, Problem 54 (or 4.54).
3. Chap. 4, Problem 79 (or 4.79). Also find EX .
4. State whether the following probabilities can be reasonably approximated by Poisson probabilities. If so, give a formula for the approximation and evaluate the binomial probabilities and Poisson probabilities numerically. Recall that $b(k, n, p)$ is the probability of exactly k successes in n independent trials with probability p of success on each trial.
 - (a) $b(3, 30, 0.01)$
 - (b) $b(39, 40, 0.99)$
 - (c) $b(25, 40, 0.5)$.
5.
 - (a) Show that as n becomes large, $b(n, 6n, 1/6)$ is asymptotic to CA^n/n^b for some constants C, A , and b and evaluate the constants.
 - (b) Do the same for $b(2n, 6n, 1/6)$.
 - (c) Asymptotically, are the two probabilities of about the same order of magnitude, or is one much smaller than the other?