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Note: Homework will not be collected, but the question for the quizzes might be picked from the homework questions.

1. Solve Problem 7.1-10 (for 9th and 10th ed.) in the textbook.

2. Solve Problem 7.1-15 (for 9th and 10th ed.) in the textbook.

3. Solve Problem 7.1-16 (7.1-17 in 9th ed.) in the textbook.

4. Let $X_1, \ldots, X_n$ be independent Bernoulli random variables with parameter p.

   (a) Review the central limit theorem, and use it to deduce that

   $$\frac{S_n - np}{\sqrt{np(1-p)}}$$

   converges to the standard normal in distribution as $n \to \infty$.

   (b) By using part a, conclude that if Y_n is the binomial random variable with parameter n and p, then the random variable

   $$\frac{Y_n - np}{\sqrt{np(1-p)}}$$

   converges to the standard normal in distribution as $n \to \infty$.

   (c) By using part (b), deduce that we have the following approximation

   $$P[Y_n \leq x] \approx P\left[Z \leq \frac{x - np}{\sqrt{np(1-p)}}\right],$$

   which becomes more accurate as $n \to \infty$.

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*Version date: Sunday 19th April, 2020, 02:12.

†This homework is based on Hanbaek Lyu's and Liza Rebrova's homeworks from the previous quarter, and I would like to thank her for her generosity here. *"Nanos gigantum humeris insidentes* (I am but a dwarf standing on the shoulders of giants)".