

Statistics 3080
Homework 11
Due: Wednesday, April 18

Complete the following problems in a R Markdown file and submit your compiled PDF.

Before you begin, you should set the random seed to your birthday month, day, and year. For example, April 18, 1992 would be 4181992. You should set the seed only once in your entire document.

Problem 1: Generate 10,000 values from the binomial distribution with the corresponding number of trials and probability of success given below. Plot each set of generated values in a histogram showing density and with bins covering one success unit. Overlay the normal distribution curve using the mean and standard deviation of the corresponding binomial distribution.

- (a) $n = 8, p = 0.1$
- (b) $n = 8, p = 0.3$
- (c) $n = 8, p = 0.5$
- (d) $n = 24, p = 0.1$
- (e) $n = 24, p = 0.3$
- (f) $n = 24, p = 0.5$
- (g) $n = 48, p = 0.1$
- (h) $n = 48, p = 0.3$
- (i) $n = 48, p = 0.5$

Problem 2: Using the plots generated in Problem 1. Assess the validity of the normal approximation to the binomial distribution for each distribution.

Problem 3: Using each of 10,000 generated values for each of the binomial distributions from Problem 1, determine the Type I error for the two-sided one-sample z-test for proportions without the continuity correction. Organize these values into a tabular structure.

Problem 4: What conclusions can you draw from the results from Problem 3 and your observations from Problem 2?

Problem 5: Repeat Problem 3 using the continuity correction. Compare the results with and without it. (Hint: Research how the continuity correction is typically applied.)