55. If $n \to \infty$ and $p \to 0$ in such a way that $np \to \lambda$, then the binomial (n, p) distribution can be approximated with the Poisson(λ) distribution. The General Rule of Thumb is that if "$n > 20$ and $np < 5$ or $n(1-p) < 5$, the Poisson distribution is a good approximation to the binomial."

(a) Run the function poisbinomapprox for combinations of n and p to see how well the binomial distribution can be approximated using the Poisson distribution.

i. Do the values of n and p satisfy the Rule of Thumb?

ii. What is the shape of the binomial distribution?

iii. The function truncates the relative errors to 300 if the error is > 300. For the PMF and the CDF,

A. What are the minimum and maximum relative errors?

B. Generally compare the errors for the PMF and CDF. If you notice a deviation in the errors from your general impression, when does that occur?

C. Do you see a trend in the errors that can be reasonably explained? If so, explain.

(b) Based on your observations, would you recommend using the Poisson distribution to approximate the binomial distribution? Explain.