|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Group # |  |  |  |  |
| Names |  |  |  |  |
| Seat Numbers |  |  |  |  |

Lab 7A: Proportion of Orange Reese’s Pieces

Your document name must have the following format: **Lab\_7A\_Group#.docx**

Your accompanying R file name must have this format: **Lab\_7A\_Code\_Group#.R**

Your R code should have comments to help readers understand your code. You should properly label each section of your code with the problem and subsection (e.g., 2c).

1) Suppose you have a bag of 1000 of Reese’s pieces. According to the manufacturer, 40% of the pieces are orange. Let X be the number of orange pieces in a random sample of 50 Reese’s pieces.

1. Under what conditions can we consider X to be binomially distributed?
2. Use R to generate 5,000 simple random samples of size 50 from the population. Plot a histogram of the resulting sample proportions of orange pieces. Superimpose a plot of a normal curve that approximates the true sampling distribution of sample proportions of orange pieces. Explain the conditions for this approximation.

2) Now, suppose 90% of the population of 1000 Reese’s pieces are orange.

1. Use R to generate 5,000 simple random samples of size 15 from the population. Plot a histogram of the resulting sample proportions of orange pieces. Superimpose a plot of a normal curve that approximates the true sampling distribution of sample proportions under the assumption that the conditions for such an approximation were met.
2. Explain if this normal approximation is appropriate. Why or why not?
3. Is the sample proportion an unbiased estimator of the population proportion , where is the number of orange pieces selected in a random sample of size ? Explain.