

Stat 100

MINITAB Project 3 (modified for version 15)

Purpose: To use MINITAB to produce density histograms for the Uniform, Standard Normal, and Binomial probability distributions from randomly generated data.

Reading: Text, 5.6 on the Binomial Distribution, 6.3 on the Standard Normal Distribution, and page 139 on the Uniform Probability Distribution.

Turn in: A total of 12 histograms (3 uniform distributions, 3 standard normal distributions, and 6 binomial distributions) and the answers to the questions at the end of this assignment.

Instructions: What follows are the MINITAB commands for producing density histograms from randomly generated data. Words in capital letters followed by the symbol > indicate a sequence of menu items to be selected/clicked.

I. The Uniform Distribution. Now have MINITAB generate random numbers from the interval [0,1] using the following commands.

CALC>RANDOM DATA>UNIFORM, then 50 rows, store in C1

CALC>RANDOM DATA>UNIFORM, then 500 rows, store in C2

CALC>RANDOM DATA>UNIFORM, then 9000 rows, store in C3

Produce the graph for the data in C1 by

GRAPH>HISTOGRAM>SIMPLE, enter C1 for X, then click

LABELS>TITLE, type "Uniform Distribution on [0,1], 50 Trials," then OK.

Click SCALE>Y SCALE TYPE>DENSITY>OK>OK. Once the graph is created, right click on the bars and then EDIT BARS>BINNING>CUTPOINT set the number of intervals to 20 then OK. Right click on the x-axis and then EDIT X-SCALE. Set the x-scale range from 0 to 1.

Repeat this procedure for the data in C2 and C3 titling the graphs appropriately.

Delete the data in C1, C2, and C3.

II. The Standard Normal Distribution. Highlight the data in the table and delete it.

Generate random data as before except with Normal data instead of uniform. Make 3 columns of 50, 500, and 9000 rows as before and produce the corresponding density histograms. Repeat the procedure in I above replacing "UNIFORM" with "NORMAL". Title the graphs "Standard Normal Distribution N(0,1), 50 Trials"...500 Trials" ...9000 Trials" respectively. Set the number of bars to 20, the x-axis limits to -3 and +3 respectively.

III-A .The Binomial Distribution with $P = .5$. First generate random data for 3 columns of 1000 rows each, $p = .5$, and $n = 10, 25,$ and 100 respectively. The commands are:

CALC>RANDOM DATA>BINOMIAL, $n = 10, p = .5,$ 1000 rows, store in C1

CALC>RANDOM DATA>BINOMIAL, $n = 25, p = .5,$ 1000 rows, store in C2

CALC>RANDOM DATA>BINOMIAL, $n = 100, p = .5,$ 1000 rows, store in C3

Produce the graphs titling them “Binomial (10,.5) Distribution, 1000 Trials” (with suitable changes for n). Set the x-axis scale on each graph (as before) so that the scale is from 0 to n. Right click on the bars and click on EDIT BARS>BINNING and set the number of intervals to 10. Leave the bin on MIDPOINT.

III-B. The Binomial Distribution with $P = .05$. Now repeat the procedure in III-A above replacing $p = .5$ with $p = .05$. Produce and print the 3 graphs titling them appropriately.

Click on a graph and then on EDITOR>LAYOUT TOOL. Set ROWS to 4 and Columns to 3. Use the tool to place your graphs in the layout. Please keep them in order.

Questions: Answer precisely and concisely the following.

1. What shapes do the uniform distributions have? Explain why they appear this way. What tendency do you notice as the number of trials increases?
2. What shapes do the standard normal distributions have? Explain why they appear this way. What tendency do you notice as the number of trials increases?
3. What shapes do the binomial distributions have for $p = .5$ and $p = .05$? Explain why they appear this way. What tendency do you notice as the number of trials increases?