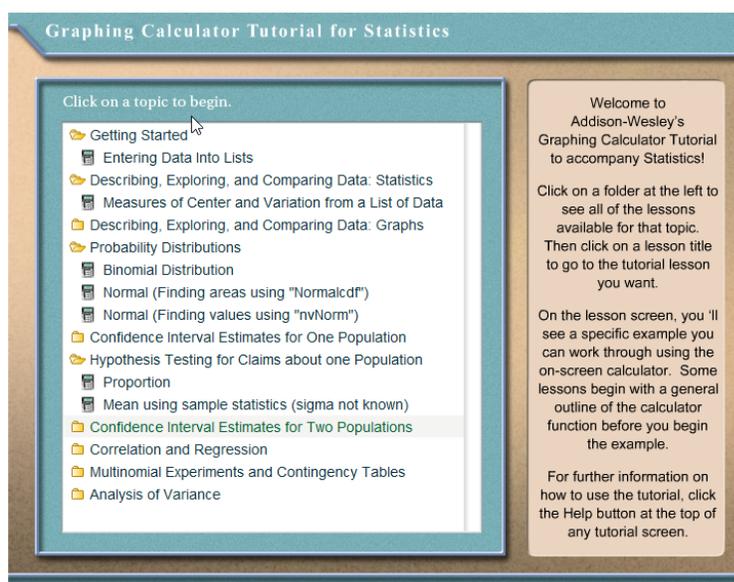# TI Calculator resources for BUS 233

1. **Graphing calculator tutorial for statistics:**
   http://media.pearsoncmg.com/aw/aw_mml_shared_1/gc_tutorial_stats/start.html

This screen shot shows a few of the procedures covered in this tutorial. Clicking on the yellow folders opens up more procedures.

2. Mathbits.com

http://mathbits.com/MathBits/TISection/Openpage.htm

This site has two sections on statistics: *Beginning Level* and *Advanced Level*. Both are useful in this course and provide step-by-step procedures. There is also a beginner's section. An example of a typical tutorial (this on the Binomial Distribution) is found at the end of this document here.

3. **jsTIfied** is an online TI-73, TI-76.fr, TI-81, TI-82, TI-82 Stats.fr, TI-83, TI-83+, TI-83+SE, TI-84+, and TI-84+SE emulator written in JS/HTML5. It is an exact functioning replica of a real graphing calculator, **so you can use it for math, graphing, statistics**, programming, and more.
   https://www.cemetech.net/projects/jstified/

   Disclaimer: I have not attempted to use this emulator, so I cannot speak to the learning curve. However, it appears to offer a way to use your TI calculator skills without an actual calculator.

4. **How to transfer files from your computer to your TI**-84 https://youtu.be/d1N5mFwk4Qc
   How do you get a file you've downloaded from the internet onto the TI-84? Using a USB cable, and some free software from Texas Instruments, it's a few easy steps. Watch this, it's quick. From the TI website, TI CE Software for Windows and Mac:
   https://education.ti.com/en/us/software/details/en/13312F7CEC074A2DAFD7EE5646129839/swticon

nectcesoftwareforwindows

5. **CellSheet™ App for the TI-83 Plus and TI-84 Plus Families** Your calculator can become a more versatile tool to use in a variety of classes with the addition of spreadsheet capabilities!
https://education.ti.com/en/us/software/details/en/139B977E62CB4BA282476B7AC9346408/83cellsheet

6. Example from Mathbits:

Binomial

Binomial Probability
"Exactly", "At Most", "At Least"

Problem used for demonstration:
A fair coin is tossed 100 times. What is the probability that:
a. heads will appear **exactly** 52 times?
b. there will be **at most** 52 heads?
c. there will be **at least** 48 heads?

Dealing
with **"Exactly":**

A fair coin is tossed 100 times. What is the probability that:
part a. heads will appear **exactly** 52 times?

We have seen that the formula used with Bernoulli trials (binomial probability) computes the probability of obtaining exactly "*r*" events in

$$\binom{n}{r} \cdot p^r \cdot q^{n-r}$$

"*n*" trials:
where *n* = number of trials, *r* = number of specific events you wish to

obtain, *p* = probability that the event will occur, and *q* = probability that the event will **not** occur (*q* = 1 - *p*, the *complement* of the event).

We have also seen that the built-in command binompdf (binomial probability density function) can also be used to quickly determine "exactly".

(Remember, the function **binompdf** is found under
DISTR (2nd VARS), arrow down to **#0 binompdf**
and the parameters are:
binompdf (*number of trials, probability of occurrence, number of specific events*)
binompdf (*n, p, r*)

Here is our answer to *part a*.

```
binompdf(100,.5,
52)
         .0735270104
■
```

If you want more information at a glance, this command can also be used to produce a list of the exact probabilities.

Prepare two lists.	In L$_2$, prepare the "exact"
In L$_1$ place the numbers from 0 to 100 for easy reference. The built-in sequence command will quickly fill L$_1$ from 0 to 100.	probabilities using binompdf, using only the number of trials and the probability of occurrence.

Prepare two lists.

In L$_1$ place the numbers from 0 to 100 for easy reference. The built-in sequence command will quickly fill L$_1$ from 0 to 100.

```
seq(X,X,0,100,1)
→L1
{0 1 2 3 4 5 6 …
■
```

```
L1    L2    L3    1
0
1
2
3
4
5
6
L1(1)=0
```

The format for seq: *expression, variable, starting value, ending value, increment.*

In L$_2$, prepare the "exact" probabilities using binompdf, using only the number of trials and the probability of occurrence.

```
DISTR DRAW
8↑Fpdf(
9:Fcdf(
0:binompdf(
A:binomcdf(
B:poissonpdf(
C:poissoncdf(
D↓geometpdf(
```

```
binompdf(100,.5)
→L2
{7.888609052ᴇ-3…
```

(This is one method of filling a list.)

The lists now contain, for 100 trials, the number of specific events (heads) in L₁ and the exact probability of occurrence in L₂. Notice that our answer for exactly 52 heads remains the same.

L1	L2	L3	1
0	8E⁻31	------	
1	8E⁻29		
2	4E⁻27		
3	1E⁻25		
4	3E⁻24		
5	6E⁻23		
6	9E⁻22		

L1(1)=0

L1	L2	L3	1
48	.07353		
49	.07803		
50	.07959		
51	.07803		
52	.07353		
53	.06659		
54	.05796		

L1(53)=52

Dealing with "At Most":

A fair coin is tossed 100 times. What is the probability that:
part b. there will be **at most** 52 heads?

The formula needed for answering *part b* is :

$$P(x \le 52) = \sum_{x=0}^{52} \binom{100}{x} \cdot (.5)^x \cdot (.5)^{100-x}$$

There is a built-in command binomcdf (binomial cumulative density function) that can be used to quickly determine "at most". Because this is a "cumulative" function, it will find the sum of all of the probabilities up to, and including, the given value of 52.

(The function **binomcdf** is found under
DISTR (2nd VARS), arrow down to **#A binomcdf**
and the parameters are:
binomcdf (*number of trials, probability of occurrence, number of specific events***)**
binomcdf (*n, p, r*)

Here is our answer to *part b.*

binomcdf(100,.5,
52)
         .6913502844
■

Again, if you want more information at a glance regarding cumulative probabilities, this command can be used to produce a list of the "at most" probabilities.

Prepare two lists.

In L_1 place the numbers from 0 to 100 for easy reference. The built-in sequence command will quickly fill L_1 from 0 to 100.

seq(X,X,0,100,1)
→L₁
{0 1 2 3 4 5 6 …
■

L1	L2	L3	1
0		------	------
1			
2			
3			
4			
5			
6			

L1(1)=0

The format for seq: *expression, variable, starting value, ending value, increment.*

In L_2, prepare the "at most" (cumulative) probabilities using binomcdf, using only the number of trials and the probability of occurrence.

DISTR DRAW
7↑X²cdf(
8:Fpdf(
9:Fcdf(
0:binompdf(
B:binomcdf(
B:poissonpdf(
C↓poissoncdf(

(Method shown below is another method of filling a list.)

L1	L2	L3	2
0		------	------
1			
2			
3			
4			
5			
6			

L2 =…cdf(100,.5)■

Notice that our answer remains the same.

L1	L2	L3	1
49	.46021		
50	.53979		
51	.61782		
52	.69135		
53	.75794		
54	.8159		
55	.86437		

L1(53) =52

Dealing with "At Least":

A fair coin is tossed 100 times. What is the probability that:
part c. there will be **at least** 48 heads?

The formula needed for answering part b is :

$$P(x \geq 48) = \sum_{x=48}^{100} \binom{100}{x} \cdot (.5)^{x} \cdot (.5)^{100-x}$$

Keep in mind that "at least" 48 is the complement of "at most" 47.

$$P(x \geq 48) = 1 - P(x \leq 47)$$

In a binomial distribution, $P(x < 48)$ is really $P(x \leq 47)$.

While there is no built-in command for "at least", you can quickly find the result by creating this complement situation by subtracting from 1. Just remember to adjust the value to 47.

(Remember, the function **binomcdf** is found under **DISTR (2nd VARS),** arrow down to **#A binomcdf**.)

The adjusted formula for "at least" is 1 - binomcdf (*n, p, r - 1*).

Here is our answer to *part c.*

```
1-binomcdf(100,.
5,47)
        .6913502844
```

The fact that this answer is the same as the "at most"
answer for the number 52, is due to the symmetric nature
of the distribution about its mean of 50.

Again, if you want more information at a glance regarding cumulative
probabilities, this subtraction process can be used to produce a list of
the "at least" probabilities.

Prepare two lists. In L_1 place the numbers from 0 to 100 for easy reference. The built-in sequence command will quickly fill L_1 from 0 to 100.	In L_2, prepare the "at least" (1 - binomcdf) probabilities, using as parameters the number of trials, the probability of occurrence, and **one less than** the value in L_1.

The format for seq: *expression, variable, starting value, ending value, increment.*

Notice that our answer is the listing for 48.