MATH 1280 Libre Office Calculator Guide

Purpose of the document:

The current course shows how to use the calculator to estimate the probabilities associated with different distributions. However, Libre Office Cal is an alternate tool that can be used in the course to estimate the probabilities associated with each distribution covered in this course. The goal of this guide is to show how to use the Libre Office Cal template to compute the same probabilities computed using the calculator.

Content

LibreOffice Calc

Jalayer Academy. (2020, Apr 2). *LibreOffice Calc - Intro, Download, and Install* [Video]. YouTube. https://youtu.be/M4korsaXavM
.A quick guide on how to download and install the LibreOffice Calc

LibreOffice. (n.d.). https://www.libreoffice.org/download/download-libreoffice/
.Use the above link to visit the official website and download the LibreOffice Suite

Math 1280 LibreOffice Calc Template

Use the link provided here (LibreOffice Calc Template Link) to access the template for the course to conduct the needed calculation.)
to access the template for the course to conduct the needed calculation.

Binomial Probability Distribution Function in the calculator

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR Go into 2nd DISTR. The syntax for the instructions are as follows: **To calculate (x = value): binompdf(n, p, number)** if "number" is left out, the result is the binomial probability table. **To calculate $P(x \leq$ value): binomcdf(n, p, number)** if "number" is left out, the result is the cumulative binomial probability table.

If you want to find P(x = value), use the pdf (binompdf). If you want to find P(x > value), use 1 - binomcdf(n,p,value).

Example:
value = 12
n= 20
p= 0.41

P(X=12) = binompdf(20,0.41,12) = 0.04173

P(X<=12) = binompdf(20,0.41,12) = 0.97378

P(X>12) = 1- P(X<=12) = 1 - binompdf(20,0.41,12) = 0.02622

Steps Using LibreOffice Calc

Using the Tab "Binomial Probability" from the Math 1280 LibreOffice Calc Template above

Enter "value", "n" and "p" then find the answer based on the question.

value =	12	*** Enter the value of in this box
n =	20	*** Enter the the number of trials
p =	0.41	*** Enter the probability of success

*** Pick the answer below based on the question you are solving

Calculate P(X=value)	Calculate P(X <=value)	Calculate P(X > value)	Calculate P(X > = value)
0.04173	0.97378	0.02622	0.06795

Geometric Probability Distribution Function in the calculator

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR **Go into 2nd DISTR. The syntax for the instructions are as follows**: To calculate the probability of a value P(x = value), use geometpdf(p, number). Here geometpdf represents geometric probability density function. It is used to find the probability that a geometric random variable is equal to an exact value. p is the probability of a success and number is the value. To calculate the cumulative probability P(x ≤ value), use geometcdf(p, number). Here geometcdf represents geometric cumulative distribution function. It is used to determine the probability of "at most" type of problem, the probability that a geometric random variable is less than or equal to a value. p is the probability of a success and number is the value. **Example:** **P=0.128** **X=10** **P(x = 10) = geometpdf(.0128, 10) = 0.01140** **P(x <= 10) = geometcdf(.0128, 10) = 0.04649** **P(x > 10)=1- P(x <= 10) =1- geometcdf(.0128, 10) = 0.95351**
Steps Using LibreOffice Calc

Using the Tab "Geometric Probability" from the Math 1280 LibreOffice Calc Template above

Enter "x" and "p" then find the answer based on the question.

| x = | 10 | *** Enter the x of in this box |
| p = | 0.0128 | *** Enter the probability of success |

*** Pick the answer below based on the question you are solving

Calculate P(X=value)	Calculate P(X <=value)	Calculate P(X > value)
0.01140	0.04649	0.95351

Normal Probability Distribution Function in the calculator

Steps Using the Calculator

USING THE TI-83, 83+, 84, 84+ CALCULATOR

Go into 2nd DISTR

After pressing 2nd DISTR, press 2: normalcdf

The syntax for the instructions are as follows:
normalcdf(lower value, upper value, mean, standard deviation)

You get 1E99 (= 10^{99}) by pressing 1, the EE key (a 2nd key) and then 99. Or, you can enter 10^99 instead. The number 10^{99} is way out in the right tail of the normal curve.

In some instances, the lower number of the area might be –1E99 (= -10^{99}). The number -10^{99} is way out in the left tail of the normal curve.

Historical Note

The TI probability program calculates a *z*-score and then the probability from the *z*-score. Before technology, the *z*-score was looked up in a standard normal probability table (because the math involved is too cumbersome) to find the probability. In this example, a standard normal table with area to the left of the *z*-score was used. You calculate the *z*-score and look up the area to the left. The probability is the area to the right.

Example:

X ~ N(63, 5), where µ = 63 and σ = 5

P(x < 65) = normalcdf(-10^{99}, 65,63,5) = 0.65542
P(x > 65) = 1- P(x <65) = 1- normalcdf(-10^{99}, 65,63,5) = normalcdf(65,10^{99}, 63,5) =0.3446

Steps Using LibreOffice Calc
Using the Tab "Normal Probability" from the Math 1280 LibreOffice Calc Template above **Enter "x", "mean" and "standard deviation" then find the answer based on the question.**

x =	65	*** Enter the x of in this box
mean =	63	*** Enter the mean
standard deviation =	5	*** Enter the standard deviation

*** Pick the answer below based on the question you are solving

Calculate P(X < value)	Calculate P(X > value)	
0.65542	0.34458	

Percentile of the Normal Distribution in the calculator

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR   invNorm in 2nd DISTR.   invNorm(area to the left, mean, standard deviation)   **Example:**   **X ~ N(63, 5), where μ = 63 and σ = 5**   **Find the 90th percentile: invNorm(0.9,63,5) = 69.4**
Steps Using LibreOffice Calc
Using the Tab "Percentile Normal Probability" from the Math 1280 LibreOffice Calc Template above   **Enter "percentile", "mean" and "standard deviation" then find the answer based on the question.**

A	B	C
percentile value =	0.9	*** Enter the area to the left of in this box
mean =	63	*** Enter the mean
standard deviation =	5	*** Enter the standard deviation

*** Pick the answer below based on the question you are solving

Calculate Percentile		
69.40776		

Calculator – Central Limit (CLT) Sample Means

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR To find probabilities for means on the calculator, follow these steps. 2ndDISTR 2:normalcdf $$normalcdf\left(lower\ value\ of\ the\ area, upper\ value\ of\ the\ area, mean, \frac{standard\ deviation}{\sqrt{sample\ size}}\right)$$ where: • *mean* is the mean of the original distribution

- *standard deviation* is the standard deviation of the original distribution
- *sample size = n*

Example:

Mean = 90; standard deviation = 15, Sample size = 25

P(85 < $\bar{x}$ < 92) = normalcdf(85,92,90,15/$\sqrt{25}$) = 0.6997

Similarly,

P(85 < $\bar{x}$ < 92) = P($\bar{x}$ < 92) - P($\bar{x}$ < 85) = normalcdf(-10^{99}, 92,90,15/$\sqrt{25}$) - normalcdf(-10^{99}, 85,90,15/$\sqrt{25}$)
=0.6997

Steps Using LibreOffice Calc

Using the Tab "CLT Means" from the Math 1280 LibreOffice Calc Template above

Enter "x", "mean", "standard deviation" and sample size then find the answer for.

P($\bar{x}$ < 92) = 0.74751
P($\bar{x}$ < 85) = 0.04779

Then,
P($\bar{x}$ < 92) - P($\bar{x}$ < 85) = 0.74751 - 0.04779 = 0.69972

x =	85	*** Enter the x of in this box
mean =	90	*** Enter the mean
standard deviation =	15	*** Enter the standard deviation (DO NOT DIVIDE BY SQUARE ROOT OF n)
sample size (n) =	25	*** Enter the sample size

*** Pick the answer below based on the question you are solving

Calculate P(X < value)	Calculate P(X > value)
0.04779	0.95221

x =	92	*** Enter the x of in this box
mean =	90	*** Enter the mean
standard deviation =	15	*** Enter the standard deviation (DO NOT DIVIDE BY SQUARE ROOT OF n)
sample size (n) =	25	*** Enter the sample size

*** Pick the answer below based on the question you are solving

Calculate P(X < value)	Calculate P(X > value)
0.74751	0.25249

Percentile Calculator – Central Limit (CLT) Sample Means

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR To find percentiles for means on the calculator, follow these steps. 2nd DIStR 3:invNorm $$k = invNorm\left(area\ to\ the\ left\ of\ k, mean, \frac{standard\ deviation}{\sqrt{sample\ size}}\right)$$

where:

- k = the kth percentile
- *mean* is the mean of the original distribution
- *standard deviation* is the standard deviation of the original distribution
- *sample size* = n

Example:

Find the 95th Percentile.
mean = 34, standard deviation =15, n= 100

$$k = invNorm\left(0.95, 34, \frac{15}{\sqrt{100}}\right) = 36.5$$

Steps Using LibreOffice Calc

Using the Tab "Percentile CLT Means" from the Math 1280 LibreOffice Calc Template above

Enter "percentile", "mean", "standard deviation" and sample size then find the answer for.

percentile value =	0.95	*** Enter the area to the left of in this box
mean =	34	*** Enter the mean
standard deviation =	15	*** Enter the standard deviation (DO NOT DIVIDE BY SQUARE ROOT OF n)
Sample size (n) =	100	*** Enter the sample size

*** Pick the answer below based on the question you are solving

Calculate Percentile
36.46728

Calculator – Central Limit (CLT) for Sums

Steps Using the Calculator
USING THE TI-83, 83+, 84, 84+ CALCULATOR

To find probabilities for sums on the calculator, follow these steps.
2^{nd}DISTR
2:normalcdf

$$normalcdf(lower\ value\ of\ the\ area, upper\ value\ of\ the\ area, (n)(mean), (\sqrt{n})(standdard\ deviation))$$

where:
- *mean* is the mean of the original distribution
- *standard deviation* is the standard deviation of the original distribution
- *sample size = n*

Example:

$$\mu_X = 90, \sigma_X = 15, and\ n = 80$$

$$Find\ P\left(\sum X > 7500\right)$$

$$normalcdf(7500, 10^{99}, (80)(90), (\sqrt{80})(15))$$

Steps Using LibreOffice Calc

Using the Tab "CLT Sums" from the Math 1280 LibreOffice Calc Template above

Enter "x", "mean", "standard deviation" and sample size then find the answer for.

x =	7500	*** Enter the x of in this box
mean =	90	*** Enter the mean (DO NOT MULTIPLY BY n)
standard deviation =	15	*** Enter the standard deviation (DO NOT MULTIPLY BY SQUARE ROOT OF n)
sample size (n) =	80	*** Enter the sample size

*** Pick the answer below based on the question you are solving

Calculate P(X < value)	Calculate P(X > value)
0.98733	0.01267

Percentile Calculator – Central Limit (CLT) for Sums

Steps Using the Calculator

USING THE TI-83, 83+, 84, 84+ CALCULATOR

To find percentiles for means on the calculator, follow these steps.
2nd DIStR
3:invNorm

$$k = invNorm(area\ to\ the\ left\ of\ k, (n)(mean), (\sqrt{n})(standard\ deviation))$$

where:
- k = the kth percentile
- *mean* is the mean of the original distribution

- *standard deviation* is the standard deviation of the original distribution
- *sample size = n*

$$\mu_X = 3$$
$$\sigma_X = 15$$
n= 50

Find the 80th percentile for the sum of the 50

$$k = invNorm(0.80, (50)(34), (\sqrt{50})(15) = 1789.3$$

Steps Using LibreOffice Calc

Using the Tab "Percentile CLT Sums" from the Math 1280 LibreOffice Calc Template above

Enter "percentile", "mean", "standard deviation" and sample size then find the answer for.

percentile value =	0.8	*** Enter the area to the left of in this box
mean =	34	*** Enter the mean (DO NOT MULTIPLY BY n)
standard deviation =	15	*** Enter the standard deviation (DO NOT MULTIPLY BY SQUARE ROOT OF n)
Sample size (n) =	50	*** Enter the sample size

*** Pick the answer below based on the question you are solving

Calculate Percentile	
1789.26741	