



Calculator ID #:

Choose 2nd MEM,
#1 About
ID****_****_****

Been Playing Games?

Run DEFAULTS to reset calculator. 2nd MEM, #7
Reset, #2 Defaults, #2
Reset

To Plot Histograms and Box-Whisker Plots:

- Place data in Lists: STAT → EDIT
- Set up plot information: STAT PLOT #1 <ENTER>
Highlight ON, choose symbol for histogram, XList: L₁
OR choose symbol for box-whisker, Freq: 1
- Graph: ZOOM #9 - TRACE to see values on graph
- Xscl under WINDOW controls width of bars on histogram.
An integer value is easiest to read.

To Get Statistical Information:

- Place data in Lists: STAT → EDIT
- Engage 1-Variable Statistics: STAT → CALC #1 1-VAR STATS
- On Home Screen indicate list containing the data: 1-VAR STATS L₁

\bar{x} = mean

S_x = the sample standard deviation

σ_x = the population standard deviation

n = the sample size (# of pieces of data)

Q_1 = data at the first quartile

med = data at the median
(second quartile)

Q_3 = data at the third quartile

Diagnostics ON: must be ON to see correlation coefficient, r .

- MODE – StatDiagnostics: ON
- CATALOG, ALPHA D,
DiagnosticOn, ENTER, ENTER

To Get Scatter Plots and Regressions

(Linear, Quadratic, Exponential, Power, etc)

- Place data in Lists: STAT → EDIT
- Graph scatter plot: STAT PLOT #1 <ENTER> Choose ON.
Choose the symbol for scatter plot, choose L₁, L₂, choose mark
- To graph, choose: ZOOM #9
- To get regression equation: STAT → CALC #4 Lin Reg($ax+b$)
(or whichever regression is needed)
- On Home Screen: LinReg($ax+b$) L₁, L₂, Y₁
- to see graph – GRAPH

To get Y₁ to appear:
VARS → Y-VARS
Choose
FUNCTION, Y₁
OR ALPHA F4

To Get Residuals: After preparing a regression equation (using L₁ and L₂), residuals are stored in a list called RESID.

To plot residuals:

- Go to top of L₃, press ENTER.
- Go to LIST (2nd STAT) – choose #7 RESID, press ENTER.
- Go to STAT PLOT, Plot 1, ON
- Type: first icon (scatter plot)
- XList: L₁ YList: L₃
- ZOOM 9:ZoomStat

Normal Distributions DISTR(2nd VARS)

- normalcdf** (lower, upper, mean, s.d.) *Finds prob. on cumulative interval.*
• to enter ∞ , use 10⁹⁹ or 1 EE 99.
- normalpdf**(x , mean, s.d.) *Graphs the normal distribution.*
• Window: Xmin = mean – 3 s.d.; Xmax = mean + 3 s.d.; Xscl = s.d.
Ymin = 0; Ymax = 1/(2 s.d.); Yscl = 0
- ShadeNorm**(lower, upper, mean, s.d.) *To see area and % under curve.*
• must graph using normalpdf first, or you won't see your shading.
- invnorm**(percentage, mean, s.d.)
• use when you know percentile and want to find the associated score.

Student-t Distributions DISTR(2nd VARS)

- tpdf** (x , df) *Probability density func. (graph only)*
• enter into Y=, x = variable, df (degrees freedom) > 0
- tcdf** (lower, upper, df) *Distribution probability*
• between lowerbound & upperbound, df > 0
- invT**(left tail area, df)
• not available on TI-83 models
(These commands are rarely, if ever, used at this level.)

Binomial Distributions DISTR(2nd VARS)

- binompdf** (#trials (n), prob. of success (p), # successes desired (r))
• used for a specific number of desired successes (> 0).
• if desired # not given, returns list of prob. 0 to # trials
- binomcdf**(# trials, prob. of success, # successes desired)
• finds prob. of up to # of successes desired
• if desired # not given, returns list of cumulative probs.

Geometric Distributions DISTR(2nd VARS)

- geometpdf** (prob. of success, specific trial #)
• finds prob. of a success on the specified trial #
 - geometcdf** (prob. of success, specific trial #)
• find prob. of success on, or before, specified trial #
- In both cases, the specified trial number can be a real number or a list of real numbers.
These can be tricky, so keep math formula handy.

Math Formula:

$$(1-p)^{r-1} \cdot p$$

$$p = \text{prob. success}$$

$$r = r^{\text{th}} \text{ trial}$$

Generating Random Numbers

Calculators and computers use a formula to generate “random numbers” which are called “pseudo-random”.

- Generate Random Integers (1 at a time):
MATH → PRB #5 randInt(
randInt (starting value, ending value)
- Generate Random Integers (several at a time):
randInt(starting value, ending value, # to be shown)
- Generate Random Integers in a List
randInt(0,10,100) → L₁
puts 100 integers between 0 and 100 inclusive in List 1
- To prevent random numbers from repeating, choose:
randIntNoRep(

- Generate rand numbers (not integers)

rand (generates random numbers between 0 and 1)

rand*12 (generates random numbers between 0 and 12)

rand(10)*12 → L₁ (generates 10 random numbers between 0 and 12 and stores them in List 1)

- Re-Seeding the Generator: To prevent the random list from always starting from the same number, you need to re-seed the rand command, such as **5** → **rand** (and then continue as you wish)

- Generate random numbers from Normal Distribution model

randNorm(mean, s.d.,) one at a time (not integers)

randNorm(mean, s.d., # to be shown) shows several at a time

Stat vs Data: • given actual data choose **Data** • given summary statistics (mean, s.d.), choose **Stats**.

Inferential Testing STAT (TESTS)

1. Z-Test(

- tests for one unknown pop. mean when pop. s.d. is known.
- Use: (1) pop. s.d. is known, (2) sample mean is known, (3) don't know pop. mean, (4) to test sample mean with some value

2. T-Test(

- test for one unknown pop. mean when pop. s.d. unknown
- Use: (1) sample mean is known, (2) don't know pop. mean, (3) to test sample mean with some value

3. 2-SampleZTest(

- test comparing 2 means when both pop. s.d. are known.
- it is unusual to know BOTH pop. s.d.
- Draw shows z-score and p-value

4. 2-SampleTTest(

- test comparing 2 means when both pop. s.d. are unknown.
- Use: (1) Both sample means and s.d. are known, (2) don't know pop. means, (3) to test sample mean with some value

5. 1-PropZTest (null hypothesis, # of successes (x), sample size (n), type of alt. hypothesis, display option)

- computes a test for one proportion of successes
- calculates z-score, p-value and proportion for sample pop.
- if given p-hat instead of # of successes, x, calculate x by multiplying p-hat by n and rounding to nearest integer.

6. 2-PropZTest (# of successes both, both counts)

- Test comparing 2 proportions of successes.
- Use: (1) working with 2 populations with different values of n where both proportions of success are known, (2) to test if there is a statistical difference.

7. Chi-Square Test (assesses goodness of fit between observed values and those expected)

- requires observed and expected data in matrix form
- X^2 -Test (matrix observed data, matrix expected data, display)

8. Chi-Square GOF Test (*goodness of fit*)

- X^2 GOF-Test [works with lists]
- use for simple random sampling, 1 categorical variable, and expected frequency of at least 5.

LinRegTTest STAT (TESTS)

- computes linear regression on data, and a t test on the value of slope and correlation coefficient
- residuals are created and stored in RESID
- use to test the degree of strength of the relationship

LinRegTInt

- Confidence interval for linear regression slope coefficient b
- computes linear regression T confidence interval for the slope coefficient b. If the confidence interval contains 0, this is insufficient evidence that the data exhibits a linear relationship.

Chi-Square Distribution DISTR(2nd VARS)

- X^2 pdf (x,df) [yields probability density function value – plots χ^2 curve with x as the variable]

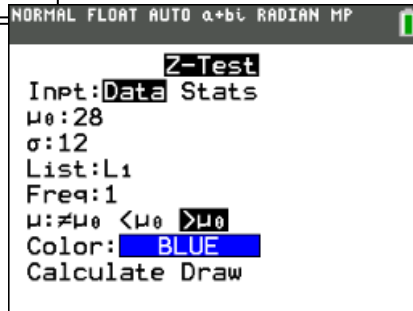
The mean of a chi-square distribution equals the number of degrees of freedom of the distribution.

- X^2 cdf (lower bound, upper bound, df)

computes the X^2 -distribution probability on interval [finds area under a chi-square distribution given the degrees of freedom] $P(\text{lower bound} < X^2 < \text{upper bound})$

Using Test Editors:

- Select *Data* or *Stats* input
 - select *Data* to enter data lists
 - select *Stats* to enter statistics such as mean, s.d., number
- Enter values for arguments
 - μ_0 = hypothesized value of population mean being tested
 - σ = known pop. s.d. (> 0)
 - List = name of list containing data
 - Freq = name of list containing frequency, defaults to 1
- Select *alternative hypothesis*
 - select first option for Z-test
 - select second for 2-SampTTest
 - select third for 2-PropZTest
- Select *Calculate* or *Draw* output/display option
 - *Calculate* shows test calculations on the home screen Will be only choice for a Confidence Level
 - *Draw* shows a graph (automatic window adjustment)



Confidence Intervals (CI) STAT (TESTS)

Calculates confidence interval for an unknown proportion of successes.

- ZInterval(**
 - computes CI for unknown pop. mean with known s.d
 - assume population distribution is normal
 - be sure to highlight Calculate before hitting Enter
- TInterval(**
 - computes CI for unknown pop. mean with unknown s.d
 - use when sample mean and s.d. are known
 - assume population distribution is normal
- 2-SampZInt(**
 - computes CI for difference between 2 pop. means when both s.d. are known (which is quite unusual).
 - depends upon user-specified confidence level
- 2-SampTInt(**
 - computes CI for difference between 2 pop. means when both s.d. are unknown.
 - use when both sample means and s.d. are known
 - assume samples are normally distributed
 - depends upon user-specified confidence level
- 1-PropZInt(**
 - computes CI for unknown proportion of successes
 - use when sample size and # of successes are known
 - depends upon user-specified confidence level
- 2-PropZInt(**
 - computes CI for difference between proportion of successes in 2 populations.
 - use when 2 samples have different # of successes
 - depends upon user-specified confidence level

ANOVA STAT (TESTS)

One-way analysis of variance.

ANOVA(L1, L2, L3, L4)

- computes a one-way analysis of variance for comparing the means of two to 20 populations (compares means).
- determines an F ratio to show if the means are significantly different from one list to another
- SS = sum of squares
- MS = mean squares