

TI 83 / TI 84 Calculator Tips for Statistics

Descriptive Statistics

To find the mean, standard deviation, median, Q_1 & Q_3 : first enter data into a list:

Stat – Edit – scroll up to top of list till L_1 is highlighted, press clear, scroll down, enter data, 2nd Quit.

Then enter Stat, Calc, 1-Var Stats, 2nd, L_1 or appropriate list #.

Example: given the following data: {1, 3, 7, 9}, determine the mean, standard deviation and variance. enter “Stat”, “Edit”, scroll to top of list, “clear”, scroll down, enter “1”, “3”, “7”, “9” 2nd, Quit, “Stat”, “Calc”, “1-Var Stats”, 2nd, L_1 , enter.

Answer: mean = 5, std dev = 3.651483717, variance = 13.3333333334 (note: to get variance, square the standard deviation)

Counting Principles

Combination: ${}_nC_r$ (n objects taken r at a time; order doesn't matter.)

enter “n”, Math, PRB, ${}_nC_r$, “r”, “enter”.

Permutation: ${}_nP_r$ (n objects taken r at a time; order does matter.)

enter “n”, Math, PRB, ${}_nP_r$, “r”, “enter”.

Factorial: ! (n objects arranged in order)

enter Math, PRB, !, “enter”.

Examples: How many ways can 7 books be arranged on a bookshelf?

enter “7”, Math, PRB, !, “enter”.

Answer: 5040

A horse race has 12 entries. Assuming that there are no ties, in how many ways can these horses finish first, second, and third?

enter “12”, Math, PRB, “3”, “enter”.

Answer: 1320

Binomial Probability

Binomial Rules:

- 2 outcomes
- Fixed # of trials
- Probabilities are constant
- Events are independent

p = probability of success

q = probability of failure

n = number of trials

To find $P(x = \#)$:

2nd Vars – “binompdf” enter (n, p, x)

To find $P(x < \#)$:

2nd Vars – “binomcdf” enter (n, p, x)

Examples: Find the probability of getting 7 heads in 10 flips of a coin.

2nd Vars – “binompdf” (10, 0.5, 7)

Answer: 0.1171875

Find the probability of getting at least 7 heads in 10 flips of a coin. $P(x \geq 7) = 1 - P(x \leq 6)$

1 – 2nd Vars – “binomcdf” (10, 0.5, 6)

Answer: 0.171875

Normal Probability

To find a probability if a Z-score is known:

2nd Vars – “normalcdf” – enter “lower limit, upper limit”

Example: $P(-0.9 < Z < 1.5)$

Enter 2nd Vars – “normalcdf”, (-0.9,1.5), enter.

Answer: 0.7491326798

If given x-scores, mean & std. dev:

2nd Vars – “normalcdf” – “lower limit, upper limit, mean, std. dev.” If $x > \#$, use 999999 as upper limit. If $x < \#$, use -999999 as lower limit.

Example: $P(40 < x < 71)$, mean = 60, std dev = 18

2nd Vars – “normalcdf” (40, 71, 60, 18) enter

Answer: 0.5961767383

To find z-scores when given cumulative probabilities:

2nd Vars – “invnorm” – (enter probability as decimal)

Example: Find z-score for P_{80} .

2nd Vars – “invnorm” (0.80) enter

Answer: 0.8416212335

To find an x-value given percent wanted, mean, std dev:

2nd Vars – “invnorm” (% wanted, mean, std dev)

Example: Given mean = 500, std dev = 120, find Q_1 .

2nd Vars – “invnorm” (0.25, 500, 120)

Answer: 419

Confidence Intervals (1 – Sample)

If you have raw data, first enter data into a list:

Stat – Edit – scroll up to top of list till L_1 is highlighted, press clear, scroll down, enter data, 2nd Quit.

z-interval: Stat – Tests – “z-interval” – choose Data if you have raw data or Stat if you have statistical data, press enter, enter rest of info requested, press calculate.

T-interval: Stat – Tests – “t-interval” – choose Data if you have raw data or Stat if you have statistical data, press enter, enter rest of info requested, press calculate.

1-PropZint: Stat – Tests – “1-PropZint” Enter information requested, press “calculate”.

Example: Given n = 20, mean = 22.9, std dev = 1.5, find the 90% CI.

Stats – Tests – “Z-interval” – “Stats”, enter statistics, press “calculate”.

Answer: (22.348, 23.452)

Hypothesis Testing (1-Sample)

If you have raw data, first enter data into a list:

Stat – Edit – scroll up to top of list till L_1 is highlighted, press clear, scroll down, enter data, 2nd Quit.

Z-Test: Stat – Tests – “Z-Test” choose Data if you have raw data or Stat if you have statistical data, press enter, enter rest of information requested, press “calculate”.

T-Test: Stat – Tests – “T-Test” choose Data if you have raw data or Stat if you have statistical data, press enter, enter rest of information requested, press “calculate”.

1-PropZtest: Stat – Tests – “a PropZtest” enter data requested, press “calculate”.

Example: Use z-Test to test claim: $\mu < 5.500$, $\alpha = 0.01$, $\bar{x} = 5.497$, $s = 0.011$, $n = 36$

Answer: $p = .05 > \alpha$, therefore, fail to reject H_0 . There is not enough evidence at the 1% level to support the claim.

Hypothesis Testing 2 Samples

If you have raw data, first enter data into a list:
Stat – Edit – scroll up to top of list till L₁ is highlighted,
press clear, scroll down, enter data, 2nd Quit.

2 SampZTest: Stat, Tests, 2-SampZTest, select Data if you have raw data, or Stats if you have statistical data, “enter”, enter requested information, press “calculate”.

2 SampTTest: Stat, Tests, 2-SampTTest, select Data if you have raw data, or Stats if you have statistical data, “enter”, enter requested information, enter “yes” for

Pooled if $\sigma_1^2 = \sigma_2^2$, otherwise enter “no”, press “calculate”.

2-PropZTest: Stat, Tests, 2-PropZTest, enter statistical data requested, press “Calculate”.

Example 1: Claim:

$$\mu_1 < \mu_2, \alpha = 0.01, \bar{x}_1, s_1, n_1, \bar{x}_2=1195, s_2=105, n_2=105$$

Decide if you should reject or fail to reject the H₀.

“Stat”, “Tests”, “2-SampZTest”, “Stats”, “enter”,

$$\sigma_1 = 75, \sigma_2 = 105, \bar{x}_1 = 1225, n_1 = 35, \bar{x}_2 = 1195,$$

$$n_2 = 105, \mu_1 < \mu_2, \text{press “Calculate”}.$$

Answer: $p = .967 > \alpha$, therefore, fail to reject H₀.

Example 2:

$$H_o : \mu_1 \geq \mu_2, \alpha = 0.10, \bar{x}_1 = 0.515, s_1 = 0.305, n_1 = 11,$$

$$\bar{x}_2=0.475, s_2=0.215, n_2=9, \text{Assume } \sigma_1^2=\sigma_2^2. \text{Decide}$$

if you should reject or fail to reject the H₀.

“Stat”, “Tests”, “2-SampTTest”, “Stats”, “enter”,

$$\bar{x}_1 = 0.515, s_1 = 0.305, n_1 = 11, \bar{x}_2 = 0.475, s_2 = 0.215,$$

$$n_2 = 9, \mu_1 > \mu_2, \text{Pooled: Yes, press “Calculate”}.$$

Answer: $p = 0.37 > \alpha$, therefore fail to reject H₀.

Example 3: Claim: $p_1 \leq p_2, \alpha = 0.10,$

$$x_1 = 344, n_1 = 860, x_2 = 304, n_2 = 800. \text{Decide if}$$

you should reject or fail to reject the H₀.

“Stat”, “Tests”, “2-PropZTest”,

$$x_1 = 344, n_1 = 860, x_2 = 304, n_2 = 800, p_1 < p_2,$$

press “calculate”.

Answer: $p = 0.20 > \alpha$, therefore fail to reject the H₀.

Linear Regression & Correlation

Before calculating r, you must enter the Diagnostic On command.

2nd, 0 (catalog), “Diagnostic On”, enter, enter.

First enter raw data into a list:

Stat – Edit – scroll up to top of list till L₁ is highlighted,
press clear, scroll down, enter data, 2nd Quit.

“Stat”, “CALC”, “LinReg (ax + b)”, 2nd, L₁ or appropriate list # for x, 2nd, L₂ or appropriate list # for y, enter. Output should look something like the following:

LinReg

$$y = ax + b$$

$$a = 11.8244078$$

$$b = 35.30117105$$

$$r^2 = .9404868083$$

$$r = .9697869912$$

where

a = slope

b = y-intercept

r² = coefficient of determination

r = correlation coefficient