

# TI-85/86 Equation Solver

Among other uses, the SOLVER on the TI-85 and TI-86 can save you having enter complicated formulas over and over again.

## ENTERING AN EQUATION

On the main screen of the calculator, use the **ALPHA** key to enter the formula, exactly as stated.

- Pressing **ALPHA** once will make the next thing you type a letter or symbol shown in blue above the keys on the keyboard.
- Pressing **ALPHA** twice sets the calculator in “Alphabet” mode. EVERY key you press will be a letter of the alphabet or a symbol shown in blue.
- If you’re in “Alphabet” mode, you can return to normal mode (so you can type things like numbers and parentheses) by hitting **ALPHA** yet again.

The basic structure of equations is NAME=VARIABLE=FORMULA

- You always have two “=” signs in the equation, one after the name of the equation and the other after the first variable.
- Equation and variable names can have any number of letters.
- If the formula includes parentheses, it is especially important that they be in the correct places.
- Hit **ENTER** after finishing the equation. You may wish to type an easy problem like  $2 + 2$  afterwards to make sure you don’t goof up what you just typed.

Here are equations you could use for this class. (You are welcome to use different forms, but these will work.)

### • ESTIMATION

- **Z or T Interval:**  $ZI\ NT=E=ZC * SD / \sqrt{N}$ 
  - E is the margin of error
  - ZC is  $z_c$  or  $t_c$ , the z or t value associated with a given confidence found in the table of your book
  - SD is the standard deviation
  - N is the number in the sample
- **Proportion Z-Interval:**  $PROERR=E=ZC * \sqrt{PHAT * (1 - PHAT) / N}$ 
  - E is the margin of error
  - ZC is  $z_c$  or  $t_c$ , the z or t value associated with a given confidence found in the table of your book.
  - PHAT is  $\hat{p}$ , the percentage of the sample with the desired characteristic.
  - N is the total number in the sample.
- These same formulas can be used to solve for sample size (n).

### • SIGNIFICANCE TESTS

- **1-Sample Z or T Test:**  $ONESAM=ZT=(XBAR - MU) / (SD / \sqrt{N})$ 
  - ZT stands for “z” or “t”, the test value you are calculating.
  - XBAR is  $\bar{x}$ , the average of your sample.
  - MU is  $\mu$ , the expected average or the overall average of the population.
  - SD is the standard deviation— $\sigma$  or s.
  - N is the total number in the sample.

- **2-Sample T-Test:**  $TWOSAM=T=(X1-X2)/(S1^2/N1+S2^2/N2)$ 
  - T is the test statistic you are calculating.
  - X1 and X2 are the means of the two samples.
  - S1 and S2 are the standard deviations of the two samples.
  - N1 and N2 are the number of items in the two samples.
- **1-Proportion Z-Test:**  $ONEPROP=Z=(PHAT-P)/\sqrt{P(1-P)/N}$ 
  - Z is the test statistic you are calculating.
  - PHAT is  $\hat{p}$ , the actual percentage of your sample with a characteristic.
  - P is the expected percentage with the characteristic or the overall percent of the population with that characteristic.
  - N is the total number of items in the sample.
- **2-Proportion Z-Test:**  $TWOPROP=Z=(PHAT1-PHAT2)/\sqrt{PP*(1-PP)/N1+PP*(1-PP)/N2}$ 
  - Z is the test statistic you are calculating.
  - PHAT1 and PHAT2 are the percentages of the two samples with the characteristic being considered.
  - PP is the pooled proportion for the two samples with the characteristic, which will be discussed in class.
  - N1 and N2 are the total number of items in each sample.

## USING THE SOLVER

1. On the main screen hit **2<sup>nd</sup>** and then **GRAPH** to enter “Solver” mode.
2. If there is anything after “eqn:” on the top line of the screen, hit **CLEAR**.
3. Use **F1** **F2** **F3** **F4** or **F5** to select the equation you want.
  - Hit **ENTER** after selecting your equation.
4. On the line that says “exp”, it should say “0”.
  - First hit **CLEAR** if there is anything on that line, then hit **0** and **ENTER**.
5. Enter the value of each variable except the one you are solving for.
  - Type the number on each line, and hit **ENTER** once you’re done.
6. When you get to the bottom, the “bound” line should say “{-1E99,1E99}”. Don’t change this line.
7. Use the **↓** and **↑** keys to move back to the variable you want to solve for.
8. Hit **F5** (SOLVE).
  - After a moment, the answer will appear on the line next to the variable you are solving for.
9. Hit **EXIT** to return to the main screen.