TI-83 and TI-84 Calculator Tips
For Chapters 6, 7, and 8

The purpose of these tips is to help make computing z-scores, t-values, confidence intervals, and test statistics.

The [ ] notation represents the button that is being pressed, and → means "then press/select". For example [STAT]→Edit can be read as press the STAT button and then move the cursor to select Edit and press enter.

Chapter 6

This is one of the few times where I actually prefer using the tables to find the probabilities of normal and standard normal distributions. However, you can also use the calculator to find the z-scores or the area inside the normal distribution instead of the tables.

Calculating area inside a normal distribution curve:

1. Press [2ND]→[VARS]
2. Select normalcdf(
    a. Note: do not select normal**pdf**(as we will never use it for this class
3. This next step will depend on if you have a TI-83 or TI-84
    a. For TI-83, type in the lower limit of your area, upper limit, mean, and standard deviation separating each by a comma.
    b. For TI-84, type in the lower limit of your area, upper limit, mean, and standard deviation in the appropriate entrees. Then select paste and hit enter.

Examples:

1. (From example 2 page 254) Find the percentage of babies who have birth weights between 2450 g and 4390 g? Assume the birth weights have a normal distribution with a mean of 3420 g and a standard deviation of 495 g.

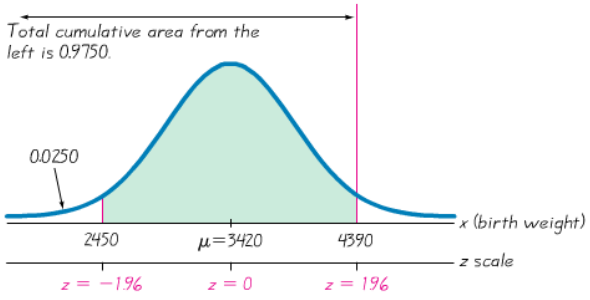
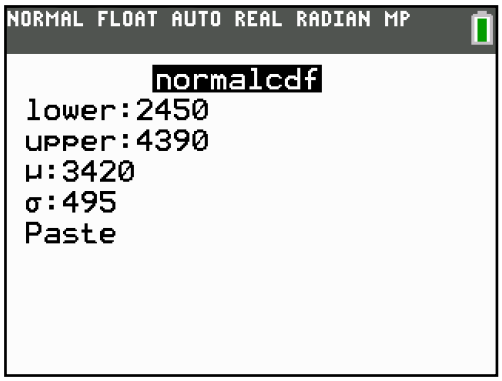
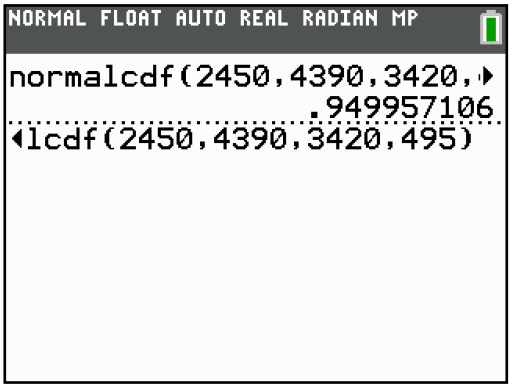


Figure 6-13 Birth Weights





2. Find the probability that for a standard normal distribution the z-score is above z = -1.23 (find the area under the standard normal curve to the right of z = -1.23)

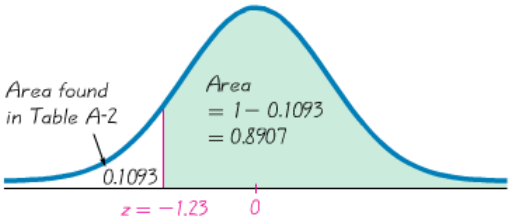
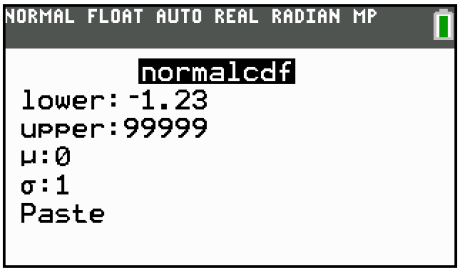
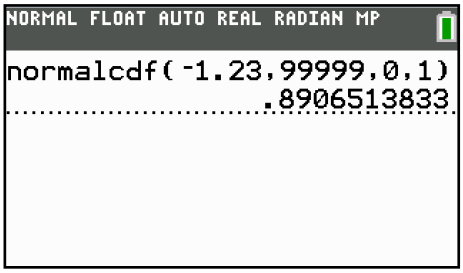


Figure 6-6 Finding the Area Above $z = -1.23$





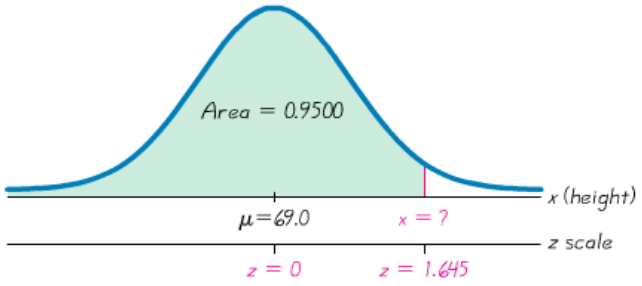
To find the area to the left of z = -1.23, you would set the lower to -99999 and the upper to -1.23 (the mean is still equal to zero and the standard deviation is still equal to 1). You should have an answer close to 0.1093.

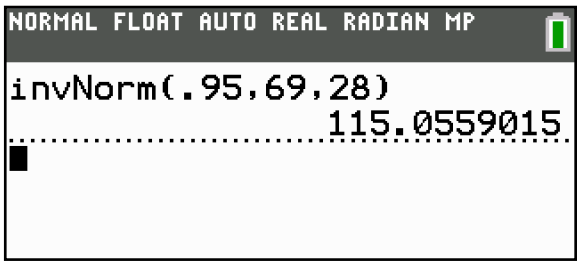
<u>Calculating the z-score or x-value with a given area to the left:</u>

1. Press [2ND]→[VARS]
2. Select invNorm(
3. This next step depends on what calculator you have
    a. For TI-83, type in the area to the left, then the mean, then the standard deviation (separating each by a comma)
    b. For TI-84, type in the area to the left, then the mean, then the standard deviation, then select paste and press enter

Example:

(From example 3 page 256) Find the 95th percentile of the heights of men (assume we have a normal distribution, the mean is 69 in. and the standard deviation is 2.8.





We can also find the z-score that gives us the 95th percentile by setting the mean to 0 and the standard deviation to 1 and we should get something close to 1.645.

Chapter 7

Chapter 7 introduces confidence intervals and t-distributions, both of which can be found using the calculator.

Calculate population proportion confidence intervals:

1. Press [STAT]→TESTS
2. Scroll down until you see 1-PropZInt... and select it.
   i. Note: Do not select 1-PropZTest (this will be used later)
3. There are three things you need to type in:
   x: number of successes (must be a whole number)
   [if they give a proportion, then x = (sample proportion)·(sample size)]
   n: sample size
   C-Level: type the confidence level as a decimal
   (use 0.95 for a 95% confidence level)
4. After selecting calculate, the calculator should calculate the confidence interval for you. Note: this does not give you the margin of error, but it can easily be calculated by the following:

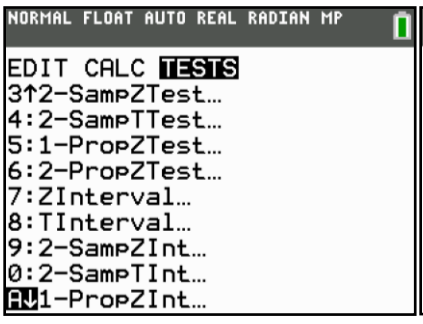
$$E = \frac{Upper\ C.I.\ Limit - Lower\ C.I.\ Limit}{2}$$ (This also does not give you the critical values.)

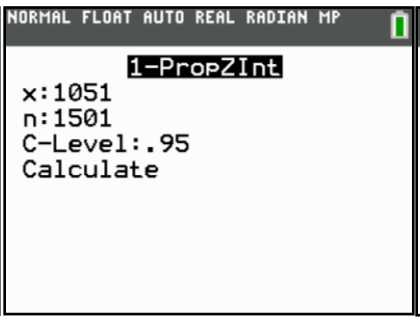
Example: (from example 3 part b, page 322)

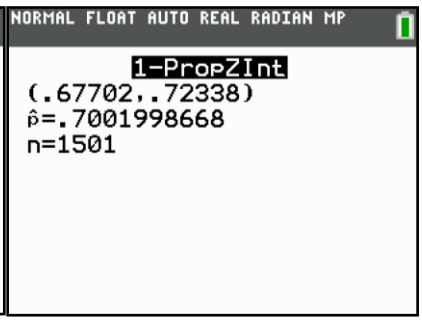
A Pew Research Center poll of 1501 randomly selected U.S. adults showed that 70% of the respondents believe in global warming. The sample results are n = 1501, $\hat{p}$ = 0.70. Find the 95% confidence interval estimate of the population proportion *p*.

Note: the problem does not tell us what x is, so we must calculate it.

x = $\hat{p} \cdot n = (0.7) \cdot (1501) = 1050.7 \approx 1051$ (using 1050.7 will give a domain error)







Thus our confidence interval is (0.677, 0.723)

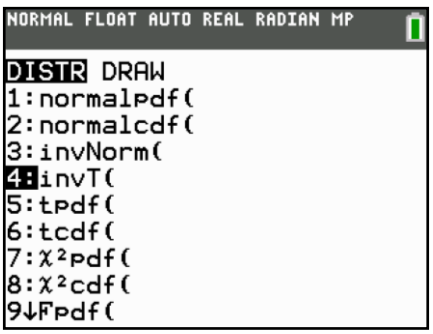
To calculate the Margin of Error using the confidence interval given above,

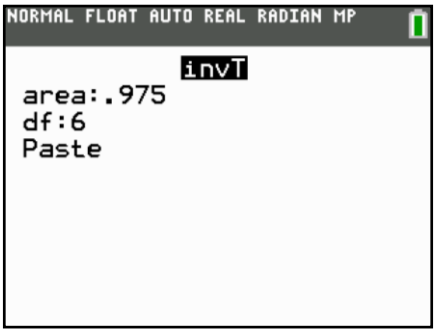
$$E = \frac{0.723 - 0.677}{2} = 0.023$$

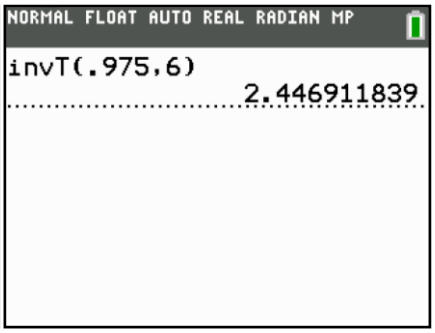
Finding critical value $t_{\alpha/2}$:

1. Press [2ND]→[VARS]
2. Look for invT(. If you have a TI-83 or an old TI-84, you might not have this. If you do not have this, you will need to program this into your calculator.
3. Type in the appropriate numbers for area and df
   area: Type in the area to the left of the t-value. (For a 95% confidence interval, the area in each tail is .025, so the total area to the left of $t_{\alpha/2}$ is .975
   df: Type in the degrees of freedom (n-1, or one less than your sample size).
4. Select Paste and hit enter.

Example: Find the critical value $t_{\alpha/2}$ for a 95% confidence interval when the sample size is 7 (df = 7 - 1 = 6).

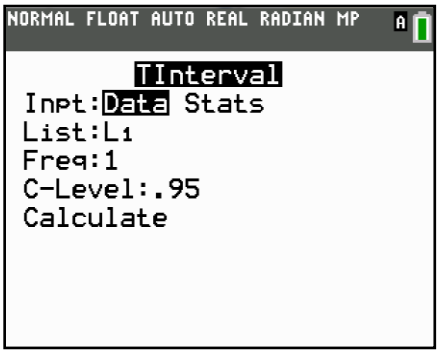






Calculate confidence intervals for estimating the population mean (σ unknown):

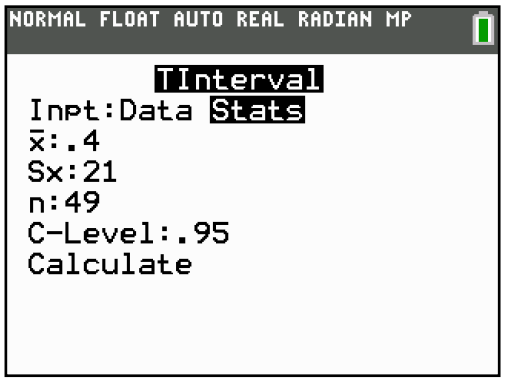
1. Press [STAT]→TESTS→TInterval(
2. There are two options for Inpt:, Data and Stats
   a. **Inpt:** if the problem only gives a list of data values with no statistics (like the mean, standard deviation, etc...), then select Data.
      i. You will need to enter the values in a list (preferably in L_1) beforehand
      List: if blank, press [2nd]→[1] to enter L_1
      Freq: this should always be set to 1
      C-Level: type the confidence level as a decimal (use 0.95 for a 95% confidence level)

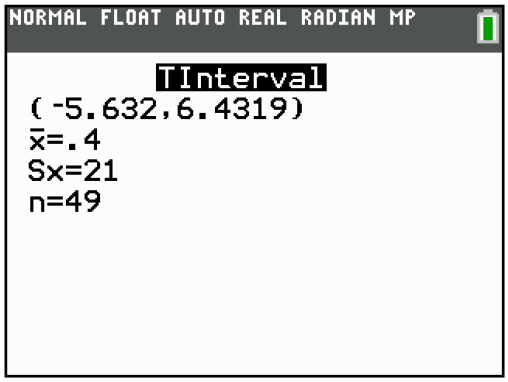


   b. **Inpt:** if the problem only gives the mean, standard deviation, and the sample size, select Stats
      $\bar{x}$: type in the sample mean
      Sx: type in the sample standard deviation
      n: type in the sample size
      C-Level: type the confidence level as a decimal (use 0.95 for a 95% confidence level

Example: (Example 2, page 346)

Use the sample statistics of n = 49, $\bar{x} = 0.4$, and $s = 21.0$ to construct a 95% confidence interval estimate of the mean net change in LDL cholesterol after the garlic treatment.





So the confidence interval is (-5.632, 6.4319).

Chapter 8

Chapter 8 introduces hypothesis testing, and there are two main methods for hypothesis testing (the p-value method and the traditional method). The calculator will find both the test statistic and the p-value, so you can still use both methods.

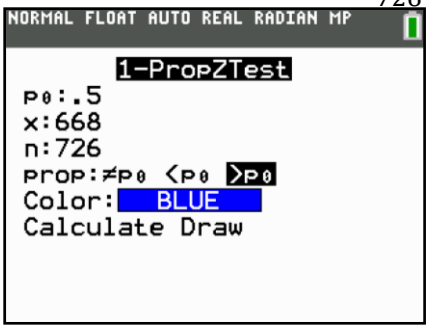
<u>Calculate hypothesis test for population proportion</u>:

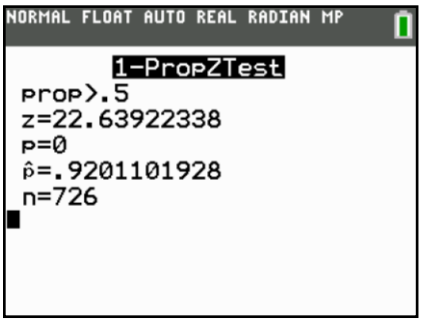
1. Press [STAT]→TESTS→1-PropZTest...
2. Type in the appropriate values
   - **p_0:** the value of your alternative proportion
   - **x:** the number of successes (or $n \cdot \hat{p}$ rounded to the nearest whole number)
   - **n:** sample size
   - **prop:** this is what your alternative hypothesis is
3. Select Calculate and hit enter

Example (example 1 page 401)

Claim: With the XSORT method, the proportion of girls is greater than 0.5.That is, p > 0.5

Sample data: n = 726, $\hat{p} = \frac{668}{726} = 0.920$ (so x=668)





Note: Unless you have the TI-84 Plus C, you will not have the "Color" or the "Draw" options.

<u>Important:</u> p = 0 is referring to the p-value = 0.000 (p is **<u>not</u>** the population proportion).

z = 22.63922338 is the test statistic

Hypothesis testing for population mean (σ unknown):

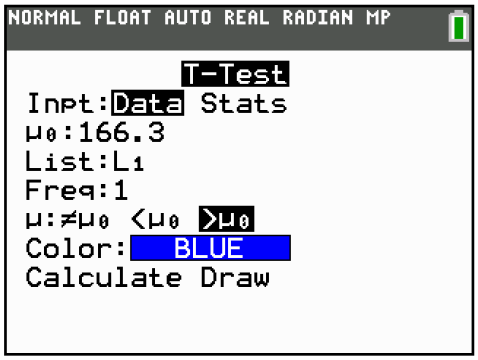
1. Press [STAT]→TESTS→T-Test...
2. The next step depends on Inpt:
   a. **Inpt:** if the problem only gives a list of data values with no statistics (like the mean, standard deviation, etc...), then select Data.

   $\boldsymbol{\mu_0}$: alternative value for the population mean

   List: L_1 (or the list you have entered the data in). The date must be entered into the list before you can conduct the hypothesis test.

   Freq: always set this to 1

   μ: the alternative hypothesis statement



   b. **Inpt:** if the problem only gives the mean, standard deviation, and the sample size, select Stats.

   $\boldsymbol{\mu_0}$: alternative value for the population mean

   $\bar{\boldsymbol{x}}$: sample mean

   Sx: type in the sample standard deviation

   n: type in the sample size

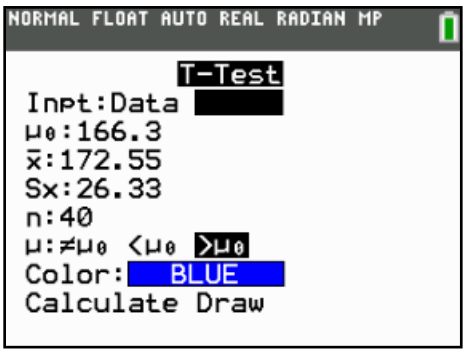
   μ: the alternative hypothesis statement

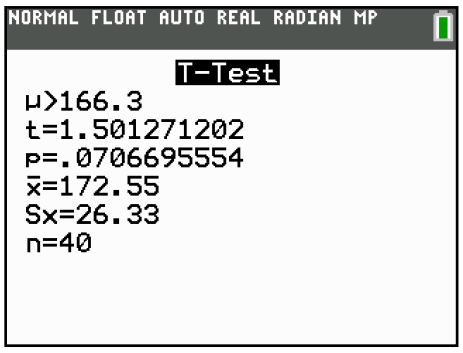
   c. Select Calculate and press enter

Example (example 1, page 422)

We have the sample statistics: $n = 40, \bar{x} = 172.55\ lb, s = 26.33\ lb$, and the population standard deviation is unknown.

Test the claim that men have a mean weight greater than 166.3 lb.





t = 1.501271202 is the test statistic

p = 0.0706695554 is the p-value