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 normalpdf( 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.
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 \( z = -1.23 \))

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.

**Calculating the z-score or x-value with a given area to the left:**

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 \( x = (\text{sample proportion}) \cdot (\text{sample size}) \)]
   - **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:
   \[
   E = \frac{\text{Upper C.I. Limit} - \text{Lower C.I. Limit}}{2}
   \]
   (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 \( t_{a/2} \):
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 \( t_{a/2} \) 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 \( t_{a/2} \) for a 95% confidence interval when the sample size is 7 (df = 7 - 1 = 6).

Calculate confidence intervals for estimating the population mean (\( \sigma \) 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.

\[
\text{So the confidence interval is } (-5.632, 6.4319).
\]

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.

Calculate hypothesis test for population proportion:

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
   - \( \hat{p} \): 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 \( x=668 \))

\[
\text{Note: Unless you have the TI-84 Plus C, you will not have the "Color" or the "Draw" options.}
\] 

**Important:** \( p = 0 \) is referring to the p-value = 0.000 (p is **not** 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.
      - \( \mu_0 \): alternative value for the population mean
      - **List:** \( L_1 \) (or the list you have entered the data in). The data must be entered into the list before you can conduct the hypothesis test.
      - **Freq:** always set this to 1
      - \( \mu \): the alternative hypothesis statement

   ![T-Test](image1)

   ![T-Test](image2)

   b. **Inpt:** if the problem only gives the mean, standard deviation, and the sample size, select Stats.
      - \( \mu_0 \): alternative value for the population mean
      - \( \bar{x} \): sample mean
      - \( S_x \): type in the sample standard deviation
      - \( n \): type in the sample size
      - \( \mu \): the alternative hypothesis statement

c. Select Calculate and press enter

Example (example 1, page 422)

We have the sample statistics: \( n = 40, \bar{x} = 172.55 \text{ lb}, S = 26.33 \text{ lb} \), 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