TI-83/84 Guide for Introductory Statistics

Includes step-by-step instructions,
practice exercises, and links to video
tutorials. Covers all calculator features
needed for AP® Statistics Exam

Instructions excerpted from
Advanced High School Statistics,
available for FREE at openintro.org

Leah Dorazio
San Francisco University High School
leah@openintro.org

August 7, 2016

Contents

Summarizing data

Entering data

TI-83/84: Entering data

The first step in summarizing data or making a graph is to enter the data set into a list. Use `STAT`, `Edit`.

1. Press `STAT`.
2. Choose `1:Edit`.
3. Enter data into `L1` or another list.

Calculating summary statistics

TI-84: Calculating Summary Statistics

Use the `STAT`, `CALC`, `1-Var Stats` command to find summary statistics such as mean, standard deviation, and quartiles.

1. Enter the data as described previously.
2. Press `STAT`.
3. Right arrow to `CALC`.
4. Choose `1:1-Var Stats`.
5. Enter `L1` (i.e. `2ND 1`) for List. If the data is in a list other than `L1`, type the name of that list.
6. Leave `FreqList` blank.
7. Choose `Calculate` and hit `ENTER`.

TI-83: Do steps 1-4, then type `L1` (i.e. `2nd 1`) or the list's name and hit `ENTER`.

Calculating the summary statistics will return the following information. It will be necessary to hit the down arrow to see all of the summary statistics.

$\bar{x}$	Mean	minX	Minimum
Σx	Sum of all the data values	Q_1	First quartile
Σx^2	Sum of all the squared data values	Med	Median
σx	Population standard deviation	maxX	Maximum
n	Sample size or # of data points		

Drawing a box plot

TI-83/84: Drawing a box plot

1. Enter the data to be graphed as described previously.
2. Hit 2ND Y= (i.e. STAT PLOT).
3. Hit ENTER (to choose the first plot).
4. Hit ENTER to choose ON.
5. Down arrow and then right arrow three times to select box plot with outliers.
6. Down arrow again and make Xlist: L1 and Freq: 1.
7. Choose ZOOM and then 9:ZoomStat to get a good viewing window.

What to do if you cannot find L1 or another list

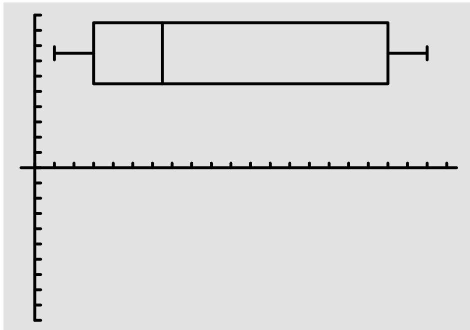
TI-83/84: What to do if you cannot find L1 or another list

Restore lists L1-L6 using the following steps:

1. Press STAT.
2. Choose 5:SetUpEditor.
3. Hit ENTER.

Practice exercises

⊙ **Guided Practice 0.1** Enter the following 10 data points into the first list on a calculator: 5, 8, 1, 19, 3, 1, 11, 18, 20, 5. Find the summary statistics and make a box plot of the data. The summary statistics should be `x̄` $= 9.1$, `Sx` $= 7.475$, `Q1` $= 3$, etc. The box plot should be as follows.



Probability

Computing the binomial coefficient

TI-83/84: Computing the binomial coefficient, $\binom{n}{k}$

Use `MATH`, `PRB`, `nCr` to evaluate n choose r. Here r and k are different letters for the same quantity.

1. Type the value of n.
2. Select `MATH`.
3. Right arrow to `PRB`.
4. Choose `3:nCr`.
5. Type the value of k.
6. Hit `ENTER`.

Example: `5 nCr 3` means *5 choose 3*.

Computing the binomial formula

TI-84: Computing the binomial formula, $P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$

Use `2ND VARS`, `binompdf` to evaluate the probability of *exactly* k occurrences out of n independent trials of an event with probability p.

1. Select `2ND VARS` (i.e. `DISTR`)
2. Choose `A:binompdf` (use the down arrow).
3. Let `trials` be n.
4. Let `p` be p
5. Let `x` value be k.
6. Select `Paste` and hit `ENTER`.

TI-83: Do steps 1-2, then enter n, p, and k separated by commas: `binompdf(n, p, k)`. Then hit `ENTER`.

Computing a cumulative binomial probability

TI-84: Computing $P(X \leq k) = \binom{n}{0} p^0 (1-p)^{n-0} + ... + \binom{n}{k} p^k (1-p)^{n-k}$

Use `2ND VARS`, `binomcdf` to evaluate the cumulative probability of *at most* k occurrences out of n independent trials of an event with probability p.

1. Select `2ND VARS` (i.e. `DISTR`)
2. Choose `B:binomcdf` (use the down arrow).
3. Let `trials` be n.
4. Let `p` be p
5. Let `x` value be k.
6. Select `Paste` and hit `ENTER`.

TI-83: Do steps 1-2, then enter the values for n, p, and k separated by commas as follows: `binomcdf(n, p, k)`. Then hit `ENTER`.

Practice exercises

⊙ **Guided Practice 0.2** Find the number of ways of arranging 3 blue marbles and 2 red marbles.[1]

⊙ **Guided Practice 0.3** There are 13 marbles in a bag. 4 are blue and 9 are red. Randomly draw 5 marbles *with replacement*. Find the probability you get exactly 3 blue marbles.[2]

⊙ **Guided Practice 0.4** There are 13 marbles in a bag. 4 are blue and 9 are red. Randomly draw 5 marbles *with replacement*. Find the probability you get *at most* 3 blue marbles (i.e. less than or equal to 3 blue marbles).[3]

[1] Use $n = 5$ and $k = 3$ to get 10.
[2] Use $n = 5$, $p = 4/13$, and x $(k) = 3$ to get 0.1396.
[3] Use $n = 5$, $p = 4/13$, and $x = 3$ to get 0.9662.

Distribution of random variables

Finding area under the normal curve

TI-84: Finding area under the normal curve

Use `2ND VARS`, `normalcdf` to find an area/proportion/probability to the left or right of a Z-score or between two Z-scores.

1. Choose `2ND VARS` (i.e. `DISTR`).
2. Choose `2:normalcdf`.
3. Enter the Z-scores that correspond to the lower (left) and upper (right) bounds.
4. Leave μ as `0` and σ as `1`.
5. Down arrow, choose `Paste`, and hit `ENTER`.

TI-83: Do steps 1-2, then enter the lower bound and upper bound separated by a comma, e.g. `normalcdf(2, 5)`, and hit `ENTER`.

Find a Z-score that corresponds to a percentile

TI-84: Find a Z-score that corresponds to a percentile

Use `2ND VARS`, `invNorm` to find the Z-score that corresponds to a given percentile.

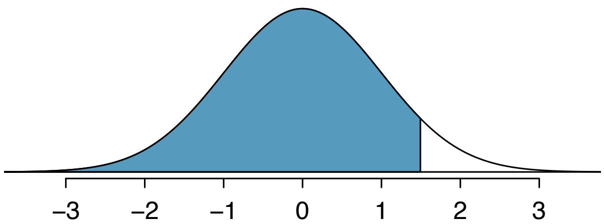
1. Choose `2ND VARS` (i.e. `DISTR`).
2. Choose `3:invNorm`.
3. Let `Area` be the percentile as a decimal (the area to the left of desired Z-score).
4. Leave μ as `0` and σ as `1`.
5. Down arrow, choose `Paste`, and hit `ENTER`.

TI-83: Do steps 1-2, then enter the percentile as a decimal, e.g. `invNorm(.40)`, then hit `ENTER`.

Practice exercises

Example 0.5 Use a calculator to determine what percentile corresponds to a Z-score of 1.5.

Always first sketch a graph:[4]



To find an area under the normal curve using a calculator, first identify a lower bound and an upper bound. Theoretically, we want all of the area to the left of 1.5, so the left endpoint should be -∞. However, the area under the curve is nearly negligible when Z is smaller than -4, so we will use -5 as the lower bound when not given a lower bound (any other negative number smaller than -5 will also work). Using a lower bound of -5 and an upper bound of 1.5, we get $P(Z < 1.5) = 0.933$.

Guided Practice 0.6 Find the area under the normal curve to right of $Z = 2$. [5]

Guided Practice 0.7 Find the area under the normal curve between -1.5 and 1.5. [6]

Example 0.8 Use a calculator to find the Z-score that corresponds to the 40th percentile.

Letting Area be 0.40, a calculator gives -0.253. This means that $Z = -0.253$ corresponds to the 40th percentile, that is, $P(Z < -0.253) = 0.40$.

Guided Practice 0.9 Find the Z-score such that 20 percent of the area is to the right of that Z-score.[7]

---

[4] normalcdf gives the result without drawing the graph. To draw the graph, do 2nd VARS, DRAW, 1:ShadeNorm. However, beware of errors caused by other plots that might interfere with this plot.

[5] Now we want to shade to the right. Therefore our lower bound will be 2 and the upper bound will be +5 (or a number bigger than 5) to get $P(Z > 2) = 0.023$.

[6] Here we are given both the lower and the upper bound. Lower bound is -1.5 and upper bound is 1.5. The area under the normal curve between -1.5 and 1.5 $= P(-1.5 < Z < 1.5) = 0.866$.

[7] If 20% of the area is the right, then 80% of the area is to the left. Letting area be 0.80, we get $Z = 0.841$.

Inference for categorical data

1-proportion z-interval and z-test

TI-83/84: 1-proportion z-interval

Use `STAT`, `TESTS`, `1-PropZInt`.

1. Choose `STAT`.
2. Right arrow to `TESTS`.
3. Down arrow and choose `A:1-PropZInt`.
4. Let `x` be the *number* of yes's (must be an integer).
5. Let `n` be the sample size.
6. Let `C-Level` be the desired confidence level.
7. Choose `Calculate` and hit `ENTER`, which returns

`(__,__)`	the confidence interval
$\hat{p}$	the sample proportion
`n`	the sample size

TI-83/84: 1-proportion z-test

Use `STAT`, `TESTS`, `1-PropZTest`.

1. Choose `STAT`.
2. Right arrow to `TESTS`.
3. Down arrow and choose `5:1-PropZTest`.
4. Let p_0 be the null or hypothesized value of p.
5. Let `x` be the *number* of yes's (must be an integer).
6. Let `n` be the sample size.
7. Choose $\neq$, $<$, or $>$ to correspond to H_A.
8. Choose `Calculate` and hit `ENTER`, which returns
   - `z` Z-statistic
   - `p` p-value
   - $\hat{p}$ the sample proportion
   - `n` the sample size

Practice exercises

⊙ **Guided Practice 0.10** A candidate selects a random sample of size $n = 500$. The proportion of people in the sample that support her is 52%. Is there significant evidence that greater than 50% of the population support her? Use a calculator to find the p-value for a test with $H_A : p > 50\%$. [8]

⊙ **Guided Practice 0.11** What percent of Americans believe the Supreme Court is doing a good job? A random sample of $n = 976$ yields a sample percent of 44%. Use a calculator to find a 90% confidence interval for the percent of all Americans that believe the Supreme Court is doing a good job. [9]

[8] p-value = 0.19

[9] The interval is (0.414, 0.471) = (41.4%, 47.1%).

2-proportion z-interval and z-test

TI-83/84: 2-proportion z-interval

Use STAT, TESTS, 2-PropZInt.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose B:2-PropZInt.
4. Let x1 be the *number* of yes's (must be an integer) in sample 1 and let n1 be the size of sample 1.
5. Let x2 be the *number* of yes's (must be an integer) in sample 2 and let n2 be the size of sample 2.
6. Let C-Level be the desired confidence level.
7. Choose Calculate and hit ENTER, which returns:

(__,__)	the confidence interval		
$\hat{p}_1$	sample 1 proportion	n_1	size of sample 1
$\hat{p}_2$	sample 2 proportion	n_2	size of sample 2

TI-83/84: 2-proportion z-test

Use STAT, TESTS, 2-PropZTest.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose 6:2-PropZTest.
4. Let x1 be the *number* of yes's (must be an integer) in sample 1 and let n1 be the size of sample 1.
5. Let x2 be the *number* of yes's (must be an integer) in sample 2 and let n2 be the size of sample 2.
6. Choose $\neq$, $<$, or $>$ to correspond to H_A.
7. Choose Calculate and hit ENTER, which returns:

z	Z-statistic	p	p-value
$\hat{p}_1$	sample 1 proportion	$\hat{p}$	pooled sample proportion
$\hat{p}_2$	sample 2 proportion		

Practice exercises

⊙ **Guided Practice 0.12** Use the data in Table 1 and a calculator to find a 95% confidence interval for the difference in proportion of dogs with cancer that have been exposed to 2,4-D versus not exposed to 2,4-D.[10]

	cancer	no cancer
2,4-D	191	304
no 2,4-D	300	641

Table 1: Summary results for cancer in dogs and the use of 2,4-D by the dog's owner.

⊙ **Guided Practice 0.13** Use the data in Table 1 and a calculator to find the Z-score and p-value for one-sided test with H_A: dogs with cancer are more likely to have been exposed to 2,4-D than dogs without cancer, $p_c - p_n > 0$.[11]

[10]Correctly going through the calculator steps should lead to an interval of (0.01484, 0.11926). There is no value given for the pooled proportion since we do not pool for confidence intervals.

[11]Correctly going through the calculator steps should lead to a solution with $Z = 2.55$ and p-value $=$ 0.0055. The pooled proportion is $\hat{p} = 0.342$.

Finding areas under the Chi-square curve

TI-84: Finding an upper tail area under the chi-square curve

Use the `X²cdf` command to find areas under the chi-square curve.

1. Hit `2ND VARS` (i.e. `DISTR`).
2. Choose `8:X²cdf`.
3. Enter the lower bound, which is generally the chi-square value.
4. Enter the upper bound. Use a large number, such as 1000.
5. Enter the degrees of freedom.
6. Choose `Paste` and hit `ENTER`.

TI-83: Do steps 1-2, then type the lower bound, upper bound, and degrees of freedom separated by commas. e.g. `X²cdf(5, 1000, 3)`, and hit `ENTER`.

Chi-square goodness of fit test

TI-84: Chi-square goodness of fit test

Use `STAT`, `TESTS`, `X²GOF-Test`.

1. Enter the observed counts into list `L1` and the expected counts into list `L2`.
2. Choose `STAT`.
3. Right arrow to `TESTS`.
4. Down arrow and choose `D:X²GOF-Test`.
5. Leave `Observed: L1` and `Expected: L2`.
6. Enter the degrees of freedom after `df`:
7. Choose `Calculate` and hit `ENTER`, which returns:
   `X²` chi-square test statistic
   `p` p-value
   `df` degrees of freedom

TI-83: Unfortunately the TI-83 does not have this test built in. To carry out the test manually, make list `L3 = (L1 - L2)² / L2` and do `1-Var-Stats` on `L3`. The sum of `L3` will correspond to the value of X^2 for this test.

Chi-square test for two-way tables

TI-83/84: Entering data into a two-way table

1. Hit `2ND` `x⁻¹` (i.e. `MATRIX`).
2. Right arrow to `EDIT`.
3. Hit `1` or `ENTER` to select matrix `A`.
4. Enter the dimensions by typing #rows, `ENTER`, #columns, `ENTER`.
5. Enter the data from the two-way table.

TI-83/84: Chi-square test of homogeneity and independence

Use `STAT`, `TESTS`, X^2`-Test`.

1. First enter two-way table data as described in the previous box.
2. Choose `STAT`.
3. Right arrow to `TESTS`.
4. Down arrow and choose `C:`X^2`-Test`.
5. Down arrow, choose `Calculate`, and hit `ENTER`, which returns

X^2	chi-square test statistic
`p`	p-value
`df`	degrees of freedom

TI-83/84: Finding the expected counts

1. First enter two-way table data as described previously.
2. Carry out the chi-square test of homogeneity or independence as described in previous box.
3. Hit `2ND` `x⁻¹` (i.e. `MATRIX`).
4. Right arrow to `EDIT`.
5. Hit `2` to see matrix `B`.

   This matrix contains the expected counts.

Practice exercises

Guided Practice 0.14 Use a calculator to find the area to right of 5.1 for a chi-square distribution with 5 degrees of freedom, i.e. find the upper tail area using a cutoff of 5.1. [12]

Guided Practice 0.15 Use the table below and a calculator to find the X^2 statistic, df, and p-value for chi-square goodness of fit test. [13]

Days	1	2	3	4	5	6	7+	Total
Observed values	1532	760	338	194	74	33	17	2948
Expected values	1569	734	343	161	75	35	31	2948

Table 2: Distribution of the waiting time until a positive trading day. The expected counts are based on a geometric model.

Guided Practice 0.16 Use the table below and a calculator to find the expected values and the X^2 statistic, df, and p-value for the corresponding chi-square test. [14]

		Congress		
	Obama	Democrats	Republicans	Total
Approve	842	736	541	2119
Disapprove	616	646	842	2104
Total	1458	1382	1383	4223

Table 3: Pew Research poll results of a March 2012 poll.

[12] Using $df = 5$ and a *lower* bound of 5.1 for the tail, the upper tail area is 0.4038.
[13] You should find that $X^2 = 15.08$, $df = 6$, and p-value $= 0.0196$.
[14] First create a 2×3 matrix ith the data. The final summaries should be $X^2 = 106.4$, p-value $= 8.06 \times 10^{-24} \approx 0$, and $df = 2$. Below is the matrix of expected values:

	Obama	Congr. Dem.	Congr. Rep.
Approve	731.59	693.45	693.96
Disapprove	726.41	688.55	689.04

Inference for numerical data

1-sample t-test and t-interval

TI-83/84: 1-sample t-test

Use STAT, TESTS, T-Test.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose 2:T-Test.
4. Choose Data if you have all the data or Stats if you have the mean and standard deviation.
5. Let μ_0 be the null or hypothesized value of μ.
   - If you choose Data, let List be L1 or the list in which you entered your data (don't forget to enter the data!) and let Freq be 1.
   - If you choose Stats, enter the mean, SD, and sample size.
6. Choose $\neq$, $<$, or $>$ to correspond to H_A.
7. Choose Calculate and hit ENTER, which returns:

t	t statistic	Sx	the sample standard deviation
p	p-value	n	the sample size
x̄	the sample mean		

TI-83/84: 1-sample t-interval

Use `STAT`, `TESTS`, `TInterval`.

1. Choose `STAT`.
2. Right arrow to `TESTS`.
3. Down arrow and choose `8:TInterval`.
4. Choose `Data` if you have all the data or `Stats` if you have the mean and standard deviation.
   - If you choose `Data`, let `List` be `L1` or the list in which you entered your data (don't forget to enter the data!) and let `Freq` be `1`.
   - If you choose `Stats`, enter the mean, SD, and sample size.
5. Let `C-Level` be the desired confidence level.
6. Choose `Calculate` and hit `ENTER`, which returns:

`(__,__)`	the confidence interval
`x̄`	the sample mean
`Sx`	the sample SD
`n`	the sample size

Practice exercises

Guided Practice 0.17 The average time for all runners who finished the Cherry Blossom Run in 2006 was 93.29 minutes. In 2012, the average time for 100 randomly selected participants was 95.61, with a standard deviation of 15.78 minutes. Use a calculator to find the T statistic and p-value for the appropriate test to see if the average time for the participants in 2012 is different than it was in 2006.[15]

Guided Practice 0.18 Use a calculator to find a 95% confidence interval for the average run time for participants in the 2012 Cherry Blossum Run using the sample data: $\bar{x} = 95.61$ minutes, $s = 15.78$ minutes, and the sample size was 100.[16]

[15] Let μ_0 be 93.29. Choose $\neq$ to correspond to H_A. $T = 1.47$, $df = 99$, and p-value$= 0.14$.
[16] The interval is $(92.52, 98.70)$.

Matched pairs t-test and t-interval

TI-83/84: matched pairs t-test

Use STAT, TESTS, T-Test.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose 2:T-Test.
4. Choose Data if you have all the data or Stats if you have the mean and standard deviation.
5. Let μ_0 be the null or hypothesized value of μ_{diff}.
   - If you choose Data, let List be L3 or the list in which you entered the differences (don't forget to enter the differences!) and let Freq be 1.
   - If you choose Stats, enter the mean, SD, and sample size of the differences.
6. Choose $\neq$, <, or > to correspond to H_A.
7. Choose Calculate and hit ENTER, which returns:

t	t statistic
p	p-value
$\bar{x}$	the sample mean of the differences
Sx	the sample SD of the differences
n	the sample size of the differences

TI-83/84: matched pairs t-interval

Use `STAT`, `TESTS`, `TInterval`.

1. Choose `STAT`.
2. Right arrow to `TESTS`.
3. Down arrow and choose `8:TInterval`.
4. Choose `Data` if you have all the data or `Stats` if you have the mean and standard deviation.
    - If you choose `Data`, let `List` be `L3` or the list in which you entered the differences (don't forget to enter the differences!) and let `Freq` be `1`.
    - If you choose `Stats`, enter the mean, SD, and sample size of the differences.
5. Let `C-Level` be the desired confidence level.
6. Choose `Calculate` and hit `ENTER`, which returns:

`(__,__)`	the confidence interval for the mean of the differences
$\bar{x}$	the sample mean of the differences
`Sx`	the sample SD of the differences
`n`	the number of differences in the sample

Practice exercises

⊙ **Guided Practice 0.19** Use the first 7 values of the data set produced below and calculate the T score and p-value to test whether, on average, Amazon's textbook price is cheaper that UCLA's price.[17]

⊙ **Guided Practice 0.20** Use the same table below to calculate a 95% confidence interval for the average difference in textbook price between Amazon and UCLA.[18]

	dept	ucla	amazon
1	Am Ind	27.67	27.95
2	Anthro	40.59	31.14
3	Anthro	31.68	32.00
4	Anthro	16.00	11.52
5	Art His	18.95	14.21
6	Art His	14.95	10.17
7	Asia Am	24.7	20.06

Table 4: A partial table of the `textbooks` data.

[17] Create a list of the differences, and use the data or list option to perform the test. Let μ_0 be 0, and select the appropriate list. Freq should be 1, and the test sidedness should be $>$. $T = 3.076$ and p-value= 0.0109.

[18] Choose a C-Level of 0.95, and the final result should be (0.80354, 7.0507).

2-sample t-test and t-interval

TI-83/84: 2-sample t-test

[h] Use STAT, TESTS, 2-SampTTest.

1. Choose STAT.
2. Right arrow to TESTS.
3. Choose 4:2-SampTTest.
4. Choose Data if you have all the data or Stats if you have the means and standard deviations.
   - If you choose Data, let List1 be L1 or the list that contains sample 1 and let List2 be L2 or the list that contains sample 2 (don't forget to enter the data!). Let Freq1 and Freq2 be 1.
   - If you choose Stats, enter the mean, SD, and sample size for sample 1 and for sample 2
5. Choose $\neq$, $<$, or $>$ to correspond to H_A.
6. Let Pooled be NO.
7. Choose Calculate and hit ENTER, which returns:

t	t statistic	Sx1	SD of sample 1
p	p-value	Sx2	SD of sample 2
df	degrees of freedom	n1	size of sample 1
$\bar{x}_1$	mean of sample 1	n2	size of sample 2
$\bar{x}_2$	mean of sample 2		

TI-83/84: 2-sample t-interval

Use STAT, TESTS, 2-SampTInt.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose 0:2-SampTTInt.
4. Choose Data if you have all the data or Stats if you have the means and standard deviations.
   - If you choose Data, let List1 be L1 or the list that contains sample 1 and let List2 be L2 or the list that contains sample 2 (don't forget to enter the data!). Let Freq1 and Freq2 be 1.
   - If you choose Stats, enter the mean, SD, and sample size for sample 1 and for sample 2.
5. Let C-Level be the desired confidence level and let Pooled be No.
6. Choose Calculate and hit ENTER, which returns:

(__,__)	the confidence interval	Sx1	SD of sample 1
df	degrees of freedom	Sx2	SD of sample 2
$\bar{x}_1$	mean of sample 1	n1	size of sample 1
$\bar{x}_2$	mean of sample 2	n2	size of sample 2

Practice exercises

Guided Practice 0.21 Use the data from the ESC experiment shown in Table 5 to find the appropriate degrees of freedom and construct a 90% confidence interval.[19]

Guided Practice 0.22 Use the data from this example to find an appropriate statistic, degrees of freedom, and p-value for a two-sided hypothesis test.[20]

	n	$\bar{x}$	s
ESCs	9	3.50	5.17
control	9	-4.33	2.76

Table 5: Summary statistics for the embryonic stem cell data set.

[19] The interval is $(4.3543, 11.307)$ with $df = 12.2$.
[20] $T = 4.008$, $df = 12.2$, and p-value= 0.00168.

Introduction to linear regression

Finding b_0, b_1, R^2, and r for a linear model

TI-84: finding b_0, b_1, R^2, and r for a linear model

Use `STAT`, `CALC`, `LinReg(a + bx)`.

1. Choose `STAT`.
2. Right arrow to `CALC`.
3. Down arrow and choose `8:LinReg(a+bx)`.
   - Caution: choosing `4:LinReg(ax+b)` will reverse a and b.
4. Let `Xlist` be `L1` and `Ylist` be `L2` (don't forget to enter the x and y values in L1 and `L2` before doing this calculation).
5. Leave `FreqList` blank.
6. Leave `Store RegEQ` blank.
7. Choose Calculate and hit `ENTER`, which returns:

`a`	b_0, the y-intercept of the best fit line
`b`	b_1, the slope of the best fit line
`r`^{2}	R^2, the explained variance
`r`	r, the correlation coefficient

TI-83: Do steps 1-3, then enter the x list and y list separated by a comma, e.g. `LinReg(a+bx) L1, L2`, then hit `ENTER`.

What to do if r^2 and r do not show up on a TI-83/84

TIP: What to do if r^2 and r do not show up on a TI-83/84
If r^2 and r do now show up when doing `STAT`, `CALC`, `LinReg`, the *diagnostics* must be turned on. This only needs to be once and the diagnostics will remain on.

1. Hit `2ND 0` (i.e. `CATALOG`).
2. Scroll down until the arrow points at `DiagnosticOn`.
3. Hit `ENTER` and `ENTER` again. The screen should now say:

```
DiagnosticOn
                    Done
```

What to do if a TI-83/84 returns: ERR: DIM MISMATCH

TIP: What to do if a TI-83/84 returns: `ERR: DIM MISMATCH`
This error means that the lists, generally L1 and L2, do not have the same length.

1. Choose `1:Quit`.
2. Choose `STAT`, `Edit` and make sure that the lists have the same number of entries.

Practice exercises

	fed_spend	poverty
1	6.07	10.6
2	6.14	12.2
3	8.75	25.0
4	7.12	12.6
5	5.13	13.4
6	8.71	5.6
7	6.70	7.9

⊙ **Guided Practice 0.23** The table contains values of federal spending per capita (rounded to the nearand percent of population in poverty for seven counties. This is a subset of a data set from Chapter 1. Use a calculator to find the equation of the least squares regression line for this partial data set.[21]

[21] $a = 5.136$ and $b = 1.056$, therefore $\hat{y} = 5.136 + 1.056x$.

Linear regression t-test and t-interval

TI-83/84: Linear regression t-test on β_1

Use STAT, TESTS, LinRegTTest.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose F:LinRegTest. (On TI-83 it is E:LinRegTTest).
4. Let Xlist be L1 and Ylist be L2. (Don't forget to enter the x and y values in L1 and L2 before doing this test.)
5. Let Freq be 1.
6. Choose $\neq$, $<$, or $>$ to correspond to H_A.
7. Leave RegEQ blank.
8. Choose Calculate and hit ENTER, which returns:

t	t statistic	b	b_1, slope of the line
p	p-value	s	st. dev. of the residuals
df	degrees of freedom for the test	r^2	R^2, explained variance
a	b_0, y-intercept of the line	r	r, correlation coefficient

TI-84: t-interval for β_1

Use STAT, TESTS, LinRegTInt.

1. Choose STAT.
2. Right arrow to TESTS.
3. Down arrow and choose G: LinRegTest.
   - This test is not built into the TI-83.
4. Let Xlist be L1 and Ylist be L2. (Don't forget to enter the x and y values in L1 and L2 before doing this interval.)
5. Let Freq be 1.
6. Enter the desired confidence level.
7. Leave RegEQ blank.
8. Choose Calculate and hit ENTER, which returns:

(___,___)	the confidence interval
b	b_1, the slope of best fit line of the sample data
df	degrees of freedom associated with this confidence interval
s	standard deviation of the residuals
a	b_0, the y-intercept of the best fit line of the sample data
r^2	R^2, the explained variance
r	r, the correlation coefficient