4. Confidence Intervals If we use the sample data in Exercise 2, we get this 95% confidence interval estimate: 1.0 mi/gal $< \mu_d <$ 3.8 mi/gal. Treating the same data as *independent samples* yields -7.8 mi/gal $< \mu_1 - \mu_2 <$ 12.6 mi/gal for a 95% confidence level. What is the difference between interpretations of these two confidence intervals?

TI-83/84 PLUS

```
T-Test
 μ>0
 t=.035713579
 p=.4858629522
 x̄=.0588235
 Sx=9.604106
 n=34
```

5. POTUS Hypothesis Test Example 1 in this section used only five pairs of data from Data Set 12 in Appendix B for a 95% confidence level. Repeat Example 1 using all of the cases with heights for both the president and the main opponent. Results are shown in the accompanying TI-83/84 Plus calculator display.

TI-83/84 PLUS

```
TInterval
 (-2.729,2.8463)
 x̄=.0588235
 Sx=9.604106
 n=34
```

6. POTUS Confidence Interval Example 2 in this section used only five pairs of data from Data Set 12 in Appendix B. Repeat Example 2 using all of the cases with heights for both the president and the main opponent. The accompanying TI-83/84 Plus calculator display shows results for a 90% confidence interval constructed from the list of differences in height. In this display, $\bar{x}$ is used instead of $\bar{d}$, and Sx is used instead of s_d. What feature of the confidence interval causes us to reach the same conclusion as in Exercise 4?

Calculations with Paired Sample Data. ***In Exercises 7 and 8, assume that you want to use a 0.05 significance level to test the claim that paired sample data come from a population for which the mean difference is $\mu_d = 0$. Find (a) $\bar{d}$, (b) s_d, (c) the t test statistic, and (d) the critical values.***

7. Oscars Listed below are ages of actresses and actors at the time that they won Oscars for the categories of Best Actress and Best Actor. The data are from Data Set 11 in Appendix B.

Actress	22	37	28	63	32
Actor	44	41	62	52	41

8. Body Temperatures Listed below are body temperatures of four subjects measured at two different times in a day (from Data Set 3 in Appendix B).

Body Temperature (°F) at 8 A.M. on Day 1	98	97.0	98.6	97.4
Body Temperature (°F) at 12 A.M. on Day 1	98	97.6	98.8	98.0

In Exercises 9–20, assume that the paired sample data are simple random samples and that the differences have a distribution that is approximately normal.

9. Oscars Use the sample data from Exercise 7 to test for a difference between the ages of actresses and actors when they win Oscars. Use a significance level of $\alpha = 0.05$.

10. Body Temperatures Use the sample data from Exercise 8 to test the claim that there is no difference between body temperatures measured at 8 A.M. and at 12 A.M. Use a 0.05 significance level.

11. Flight Operations The table below lists the times (min) required for randomly selected flights to taxi out for takeoff and the corresponding times (min) required to taxi in after landing. (See Data Set 15 in Appendix B.) All flights are Flight 1 of American Airlines from New York (JFK) to Los Angeles (LAX). Construct a 90% confidence interval estimate of the difference between taxi-out times and taxi-in times. What does the confidence interval suggest about the claim of the flight operations manager that for flight delays, more of the blame is attributable to taxi-out times at JFK than taxi-in times at LAX?

Taxi-Out Time	30	19	12	19	18	22	37	13	14	15	31	15
Taxi-In Time	12	13	8	21	17	11	12	12	15	26	9	11

12. Brain Volumes of Twins Listed below are brain volumes (cm^3) of twins listed in Data Set 6 of Appendix B. Construct a 99% confidence interval estimate of the mean of the