

ayburn's Christmas Tree Farm has 2500 trees that are mature and ready to be cut and sold. Twenty-eight trees are randomly selected and their heights measured. The heights in inches are as follows:

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 56 | 71 | 73 | 54 | 44 | 48 | 61 | 61 | 48 | 53 | 62 | 73 | 59 | 65 |
| 64 | 56 | 72 | 56 | 70 | 54 | 60 | 67 | 43 | 47 | 35 | 71 | 45 | 57 |

**INSTRUCTIONS** (use PHSTAT2)

\* Enter label and data in column A.

\* Construct a confidence interval for the data set:

Click on: PHStat, CONFIDENCE INTERVALS, then  
ESTIMATE FOR THE MEAN, SIGMA UNKNOWN

Enter the appropriate confidence level.

Choose SAMPLE STATISTICS UNKNOWN

Enter the SAMPLE CELL RANGE [cells (in column A) where data is located].

\* Also include Descriptive Statistics (as on Homework #1).

Answer the following:

1. Give a point estimate for  $\mu$  (label it).
2. Give the standard error of  $\bar{X}$  (label it).
3. Give the 99% confidence interval for  $\mu$ .
4. Interpret (in context) the interval in #3.
5. If the trees sell for \$4.20 per foot, use the interval in #3 to give a lower and upper bound estimate on the value of the 2500 trees with 99% confidence.  
**SHOW YOUR WORK!!**
6. Give the standard deviation (label it).
7. Calculate the margin of error **by hand** using only the information you gave in #1 and/or #2, and a value from the appropriate statistical table.
8. Again, using only the information in #1 and/or #2, and a value from the appropriate statistical table, calculate (**by hand**) a 95% confidence interval for  $\mu$ .
9. How large a sample must you obtain if you want to be 92% confident that the sample mean is within 0.85 inches of the true mean?

**Do not calculate anything that has already been calculated by EXCEL.**

### C. Chapter 9: Hypothesis Testing

Open Height-Weight.xlsx. Suppose these data to be sample data from a large population. ,  
(perform operations on EXCEL),

C1. Test the Hypothesis:  $H_0: \mu = 170$

$H_a: \mu \neq 170$

$\mu$  is the population average for Height.  $\alpha = 0.05$

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### D. Chapter 13: Simple Linear Regression

Open file: Height-Weight.xlsx. The table gives Height (in centimeters) and Weight (in kilograms), for a sample of  $n = 15$ , 18 years old girls. Interest in predicting the weight from height.

Draw a scatterplot of Weight on the vertical, versus Height on the horizontal. Notice any pattern.

(1) Calculate the coefficient of correlation  $r$

(2) From the Summary Output:

(a) Coefficient of determination  $R =$  \_\_\_\_\_

(b)  $R^2 =$  \_\_\_\_\_

(c) Standard error ( of the residuals)= \_\_\_\_\_

(d) Number of observations= \_\_\_\_\_

(3) From the ANOVA (Analysis of Variance) output:

SS (Sum of Squares); df (degree of freedom); MS (Mean Square)

(e)  $SS_{Reg} =$  \_\_\_\_\_ ;  $df_{Reg} =$  \_\_\_\_\_ ;  $MS_{Reg} =$  \_\_\_\_\_ ;

(f)  $SS_{Res} =$  \_\_\_\_\_ ;  $df_{Res} =$  \_\_\_\_\_ ;  $MS_{Res} =$  \_\_\_\_\_

(g)  $SS_{Total} =$  \_\_\_\_\_ ;  $df_{total} =$  \_\_\_\_\_ ;

B2

The makers of QUICK TAX software claim that their customers spend less than 9 hours filing tax returns while using their product. The time, in hours, spent filing tax returns for a survey of individuals who use QUICK TAX is given below:

|      |     |      |     |      |
|------|-----|------|-----|------|
| 2.9  | 6.2 | 11.5 | 8.0 | 2.7  |
| 4.8  | 9.1 | 2.6  | 6.2 | 3.3  |
| 10.4 | 4.9 | 14.9 | 9.2 | 6.4  |
| 3.5  | 7.0 | 10.3 | 8.5 | 4.4  |
| 8.2  | 9.4 | 9.5  | 7.4 | 11.2 |

**INSTRUCTIONS** (use PHStat2)

Column A should contain the data with label.

Conduct a hypothesis test using  $\alpha = .05$  :

Click on PHStat, ONE-SAMPLE TESTS, then choose the appropriate test.

Enter the necessary information.

(for "Null Hypothesis," enter the hypothesized mean)

Also include Descriptive Statistics (as on Homework #1).

Answer the following (in context using the data set above):

1. State  $H_0$  and  $H_a$
2. Does an assumption have to be made in this case? If so, what is it?  
(make sure you explain with respect to this particular situation)
3. Give the test statistic (label it) and the p-value.
4. Define and sketch the rejection region. (make sure you give the critical value(s))
5. Give a conclusion (in words!)
6. Using only the information on your output and a value from the appropriate table, calculate (in the most efficient way possible) a 95% confidence interval for the mean.