

JMP® Introductory Lab Activities

Activity 11: Hypothesis Testing, the *t*-Test



Data Set: See the data below.

Summary

In 1738, the Paris observatory determined that the angle of the Earth's spin (obliquity) was 23.4722° . This was accomplished through the use of a new measurement technique. One of the astronomers believed that this angle was different from those measured in the past. Historical accounts were examined and five measurements were randomly selected, dating from 1460 to 1570.

These results differed somewhat from the Paris measurements. You are going to examine the question of whether these differences reveal a real change in the measurement of the Earth's rotation angle or whether they can be attributed to chance variability. You'll summarize your test results and conclusions in a report (required output and discussion is in italics).

Create a JMP® Data Table

The following are the data from the historical accounts.

Source	Date	Obliquity
Regiomontanus	1460	23.5
Copernicus	1500	23.47333
Waltherus	1500	23.48778
Danti	1570	23.50778
Tycho	1570	23.525

In JMP, select **New Data Table** from the **JMP Starter** window (or use **File > New > New Data Table**). Enter this data, including the variable names (as column headers).

Once you've created the data table, go to **File > Save As** to save.

Note: If you have an electronic version of this activity, you can copy and paste this data directly into a new JMP data table (use **Edit > Paste with Column Names** to paste the first row into the data table as column names).

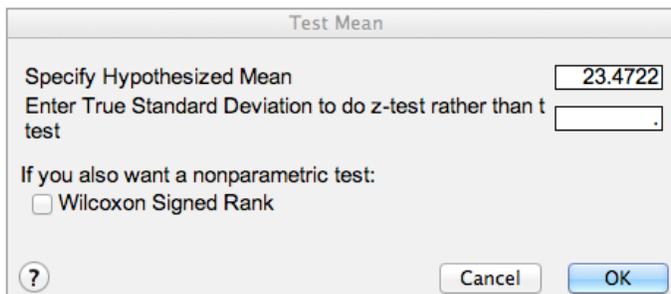
Conducting a t -Test in JMP®

To conduct a one-sample t -test using JMP, go to **Analyze > Distribution**, select **Obliquity** for the **Y, Columns** variable and click **OK**.

Click on the red triangle next to Obliquity, and choose **Test Mean**.

Enter the Paris measurement for the mean, and leave the standard deviation blank.

As JMP indicates, because you don't know the population standard deviation, you will perform a t -test rather than a z -test.



The results are provided in the **Test Mean** table.

- The p -value for the two-sided test is reported next to **Prob > |t|**.
- The p -value for the one-sided tests are reported next to **Prob > t** and **Prob < t**.

(The signs in the one-sided p -values correspond to the signs in the alternative hypotheses.)

Using your results from JMP, write a complete hypothesis test, using one of the commonly used alpha levels.

Include:

- *Assumptions*
- *Hypotheses*
- *Sample statistic values*
- *The test statistic*
- *The p -value*
- *Conclusions in the context of the problem*

In addition, copy the data table, a graphical display of the data, and hypothesis test results from JMP into your report.

Circle the test statistic and p -value results from the JMP output, and explain how you chose the proper p -value for this test.

In your solution, remember to answer the original question posed.