Connexions module: m17338

NORMAL DISTRIBUTION: NORMAL DISTRIBUTION LAB I (EDITED: TEEGARDEN)*

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Based on Normal Distribution: Normal Distribution Lab I^{\dagger} by Barbara Illowsky, Ph.D.

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Abstract

Labs changed to incorporate mini-tabs.

Normal Distribution Lab Name:

1 I Student Learning Outcome:

- * The student will compare and contrast empirical data and a theoretical distribution.
 - * Find Probabilities for specific Normal Distributions

2 II The Situation

It is generally accepted that the mean body temperature is 98.6 degrees. If a sample of size 100 resulted in a sample mean of 98.3 degrees with a standard deviation of 0.64 degrees. Does this sample suggest that the mean body temperature is actually lower than 98.6 degrees?

3 III Simulation: To answer the question, complete the following simulation.

Using Minitab (Calc -> Random Data-> Normal), generate 100 values from a normally distributed population with a mean of 98.6 degrees and a standard deviation of 0.64 degrees (using the sample standard deviation given in the situation since the population deviation is unknown). Repeat the simulation 9 more times for a total of 10. (Requesting the data be stored in c2-c10 will generate the remaining 9 columns of data with one command.)

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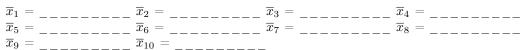
[†]http://cnx.org/content/m16981/1.7/

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4 IV Data Collection

Use Stats -> Basic Stats -> Display Descriptive and select all 10 columns to determine the sample mean for each data set. Record the values below and include the session window with this lab.



5 V Analyze the Data – Using complete sentences.

Based on your simulation, do you think that a sample of size 100 with a mean temperature of 98.3 is reasonable? Answer using 2-3 complete sentences.

6 VI Finding Probabilities for Normal Distribution

For each of the following, first write the question in **symbolic form** and then using Minitab (Calc -> Probability Distributions -> Normal), find the probabilities. (attach your session window to this lab)

- 1. Given a population with a normal distribution, a mean of 0, and a standard deviation of 1, find the probability of a value less than 1.25
- 2. Given a population with a normal distribution, a mean of 25, and a standard deviation of 3, find the probability of a value greater than 21.25.
- 3. Given a population with a normal distribution, a mean of 100, and a standard deviation of 20, find the probability of a value between 87 and 122.
- 4. Given a population with a normal distribution, a mean of 150, and a standard deviation of 35, what value has an area of 0.34 to the left?
- 5. Given a population with a normal distribution, a mean of 150, and a standard deviation of 35, what value has an area of 0.34 to the right?
- 6. Given a population with a normal distribution, a mean of 15, and a standard deviation of 2, what value has an area of 0.8 to the left?