Testing a Claim About a Mean

Colby Community College

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Test Statistic

$$t = \frac{\bar{x} - \mu_{\bar{x}}}{\frac{s}{\sqrt{n}}}$$

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Recall

The degrees of freedom are given by

$$df = n - 1$$

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- The standard deviation of the Student t varies with the sample size and is greater than 1.
- As the sample size n gets larger, the Student t distribution gets closer to the standard normal distribution.

Example 1

The National Health and Nutrition Examination Study included the sleep times for randomly selected adult subjects:

$$4 \quad 8 \quad 4 \quad 4 \quad 8 \quad 6 \quad 9 \quad 7 \quad 7 \quad 10 \quad 7 \quad 8$$

The unrounded statistics for this sample are

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Using $\alpha = 0.05$ let us test the claim that the mean amount of sleep for adults is less than 7 hours.

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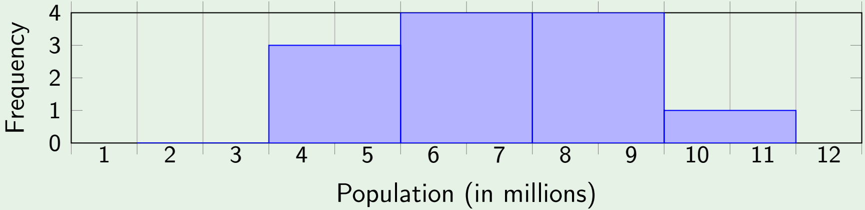
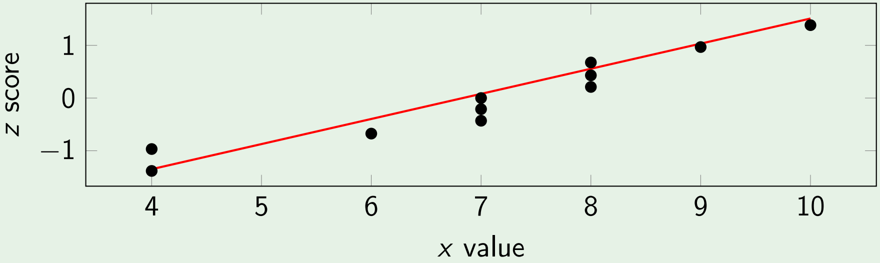
We first need to check that the requirements have been met. Since we have a sample size less than 30, we need to check for normality.





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4. Since $0.388689 > 0.05$, we fail to reject the null hypothesis.

We conclude that there is not sufficient to support the claim that the mean amount of adult sleep is less than 7 hours.

Example 2

Data Set 3 "Body Temperatures" includes measured body temperatures with these statistics for 12 AM on day 2:

$$n = 106 \qquad \bar{x} = 98.20^\circ\text{F} \qquad s = 0.62^\circ\text{F}$$

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4. Since $0.00000000140369 < 0.05$, we reject the null hypothesis.

We conclude that there is sufficient evidence to warrant rejection of the common belief that the population mean is 98.6°F.