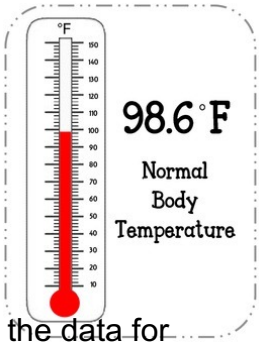
Name: _____ Hour: _____ Date: _____

Lesson 11.1: Day 2: What is normal body temperature?



For many years, doctors have told people that "normal" body temperature is 98.6 degrees Fahrenheit. Today, we will try to find out if this is true.

Take your body temperature and record it on whiteboard. Record the following for the data for the whole class (think of our class as an SRS of all high school students)

Answers Vary $\bar{x} =$ $s_x =$ $n =$

Do the data provide convincing evidence that the mean normal body temperature is different than the doctor's claim? Assume the conditions have been met.

State: Parameter: μ → true mean body temperature for all HS students Statistic: $\bar{x} =$ $s_x =$

Hypotheses: $H_0: \mu = 98.6$ α: 0.05

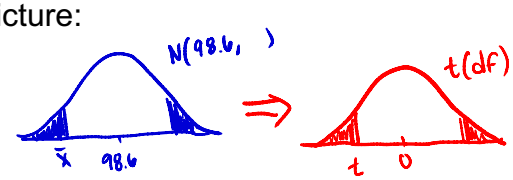
Two Sided → $H_a: \mu \neq 98.6$

Plan: Name of procedure: One Sample t test for μ.

Do: General: Test Statistic = $\frac{\text{Statistic} - \text{parameter}}{SD}$

Specific: $t = \frac{\bar{x} - \mu}{s_x/\sqrt{n}}$

Picture:



Work:

Test Statistic:

P-value: Answers Vary

Conclude:

Another class did the same activity with these results: $\bar{x} = 97.9$ $s_x = 1.6$ $n = 30$

1. Use T-test on the calculator to find the *P*-value = 0.023

Reject H_0 at $\alpha = 0.10$? Yes Reject H_0 at $\alpha = 0.05$? Yes Reject H_0 at $\alpha = 0.01$? Yes

2. Use TInterval on the calculator to find the following confidence intervals.

90%: (97.404, 98.396) 95%: (97.303, 98.497) 99%: (97.095, 98.705)

Reject H_0? Yes Reject H_0? Yes Reject H_0? No

Two-sided Test $\alpha = 1 - C\%$

3. What connection do you notice between your answers to #1 and #2?

A C% confidence interval will lead to the same decision as a significance test with an $\alpha = 1 - C\%$ level.

Two-sided

STATS MEDIC

Name: _____ Hour: _____ Date: _____

Lesson 11.1 Day 2– Significance Test for μ

Important ideas:

LT #1 4-Step

State: Parameter, Hyp., stat, α

Plan: Name procedure, check conditions
① Random
② 10%
③ Normal

Do: General, specific, work, picture, test stat
p-value

Conclude: Interpret p-value, make decision, context.

LT #2 Two sided tests and confidence intervals

If H_0 value in interval → fail to reject H_0. H_0 is plausible.

If H_0 value is not in interval → reject H_0. H_0 is not plausible.

A C% confidence interval will make the same decision as a two sided significance test using $\alpha = 1 - C\%$ level.

Check Your Understanding

According to the National Center for Health Statistics, the mean systolic blood pressure for males 35 to 44 years of age is 128. The health director of a large company wonders if this national average holds for the company's middle-aged male employees. So the director examines the medical records of a random sample of 72 male employees in this age group and records each of their systolic blood pressure readings.

1. State an appropriate pair of hypotheses for a significance test in this setting. Be sure to define the parameter of interest.

$H_0: \mu = 128$

$H_a: \mu \neq 128$

μ → true mean systolic blood pressure for the company's middle aged male employees.

2. A 95% confidence interval for the mean systolic blood pressure of all 35- to 44-year-old male employees at this company is (126.43, 133.43). Based on this interval, what conclusion would you make for a test of the hypotheses in Question 1 at the α = 0.05 significance level?

The 95% confidence interval includes 128 as a plausible value so we fail to reject H_0 at $\alpha = 0.05$. We do not have convincing evidence that the true mean systolic blood pressure for the company's male employees is different from 128.