

Due Date: Jan 24

Key

In this lab we will investigate this issue:

You are given a similar set of sample data collected from healthy men and women, ages 18 to 40, to test the hypothesis that the mean body temperature of an adult human is 98.6° F.

[illegible]

Temperature (in °F)	# of Adults	Midpoint	Frequency	Midpoint*Frequency
96.0-96.4	2	96.2	2	$96.2 \times 2 = 192.4$
96.5-96.9	4	96.7	4	$96.7 \times 4 = 386.8$
97.0-97.4	13	97.2	13	1263.6
97.5-97.9	21	97.7	21	2051.7
98.0-98.4	38	98.2	38	3731.6
98.5-98.9	33	98.7	33	3257.1
99.0-99.4	15	99.2	15	1488
99.5-99.9	2	99.7	2	199.4
100.0-100.4	1	100.2	1	100.2
100.5-100.9	+ 1	100.7	+ 1	+ 100.7
Total	130		130	12771.5

- Complete the table above.
(15 points)
- How many healthy adults were studied in this sample concerning "normal" body temperature?
Include units. (5 points)

$$n = \underline{130}$$

- Use StatCrunch to calculate the sample mean and sample standard deviation. Include units with ALL answers. (10 points)

*Round to 3 decimal places.

$$\bar{x} = \underline{98.246^\circ\text{F}}$$

$$s = \underline{0.769^\circ\text{F}}$$

- Use the midpoints above (including units) to estimate the sample mean. (Hint: This is the same as finding the weighted sample mean.) How does this estimate of the sample mean compare to the true sample mean in #3? (10 points)

$$\text{estimated sample mean} = \frac{12771.5}{130} = 98.242^\circ\text{F}$$

This estimate is very close to the true sample mean.

5. Use StatCrunch to calculate these sample statistics. Include units with ALL answers. (45 points)

- a. Mode = 98.4°F
- b. Minimum = 96°F
- c. First Quartile = 97.7°F
- d. Median = 98.3°F
- e. Third Quartile = 98.7°F
- f. Maximum = 100.7°F
- g. Range = 4.7°F
- h. Interquartile Range = 1°F

i. Are there any outliers using the Interquartile Range Rule? Explain.

$$1.5(IQR) = 1.5(1) = 1.5$$

Any data below $97.7 - 1.5 = 96.2$? Yes, 96°F is an outlier.

Any data above $98.7 + 1.5 = 100.2$? Yes, 100.7°F is an outlier.

* use 10 classes!
6. Sketch and label a histogram of the sample temperatures. You should use StatCrunch and print a copy to turn in. (Hint: Bins should start at the minimum temperature of 96.0°F and the width should be 0.5°F. **5 point Bonus:** Clearly explain why the bins should have a width of 0.5°F.) (5 points)

See Histogram Bonus: $\frac{100.7 - 96}{10} = 0.47 \rightarrow$ Round to a width of 0.5.

7. Does this sample of temperatures approximate a symmetric and bell-shaped (normal) distribution? Explain. (5 points)

The sample is approximately symmetric & bell-shaped because a majority of data is in the "middle" with similar tails on each side.

8. Do you **reject** or **do not reject** the statement that the mean body temperature of an adult human is 98.6°F? Explain. (5 points)

I reject the statement that the mean body temperature of an adult human is 98.6°F because the mean appears to be closer to 98.2°F.

