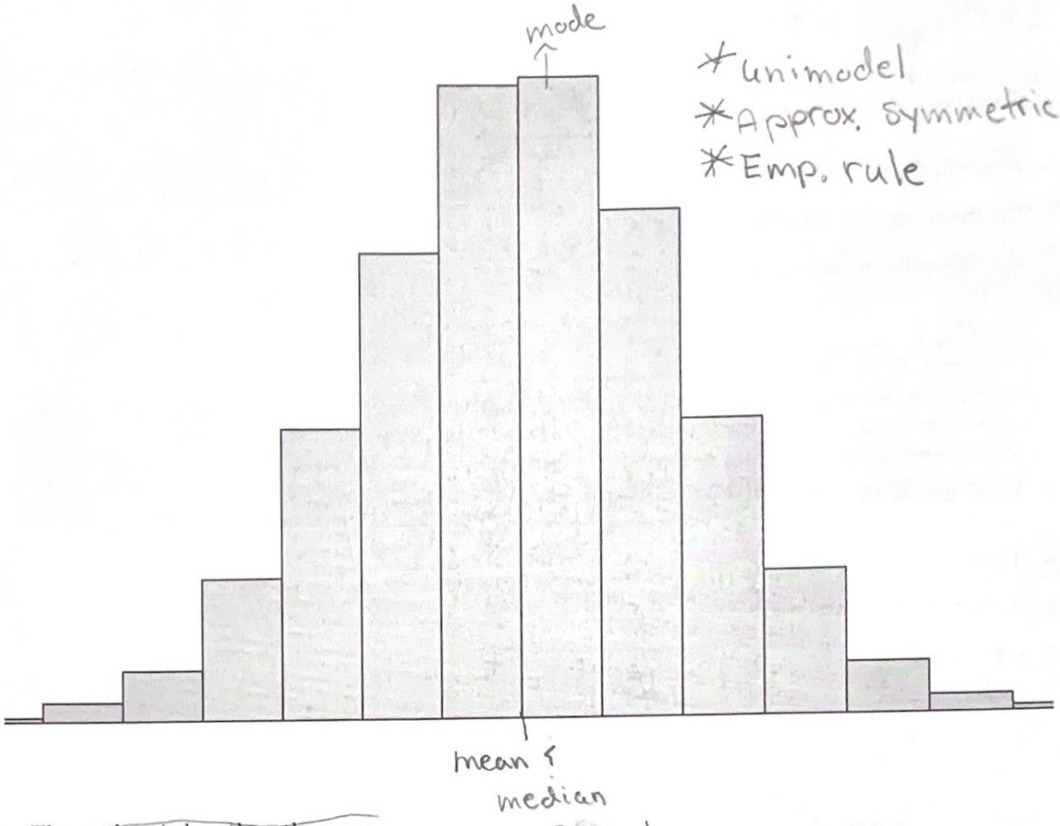
Caelan

HW2_240_SPR25

2025-01-31

1. (Select all that apply) Which of the following is true about this data:



* unimodel
* Approx. symmetric
* Emp. rule

a. ~~The median is less than the mean~~

b. ~~There is more than one mode~~

c. The median is equal to the mean

d. 95% of the data is within $\mu \pm 2\sigma$

e. ~~The second quartile is approximately equal to the mode~~

f. ~~The median is greater than the mean~~

Q_2 = median

2. What percentage of observations in a distribution lie between the first and third quartile?

a. 25%

b. 50%

c. 75%

Q_1 25^{th} sol. Q_2 75^{th}

3. To make a boxplot of a distribution, you must know:

a. all the individual observations

b. the mean and the standard deviation

c. the five-number summary

4. What are all the values that a standard deviation s can possibly take?

a. $0 \leq s$ ↳ Can't have (-) ↳ unbounded measure

b. $0 \leq s \leq 1$ → bounded measure

c. $-1 \leq s \leq 1$

Resistance

5. Which of the following is least affected if an extreme high outlier is added to your data?

a. the median what measures are resistance

~~b. the mean~~

~~c. the standard deviation~~

The previous homework described a study of female golden orb weaver spiders. The study also reported the body mass (in grams) for each of the 21 spiders. Here are the data:

0.04	0.11	0.16	0.07	0.18	0.1	0.17
0.25	0.36	0.33	0.29	0.14	0.32	0.57
0.31	0.79	0.49	0.64	0.6	0.99	0.81

1 Low → n 21 high

Q1 Q3

0 1 2 3 4 5

6. Give the five number summary and the mean for this data. How do the mean and the median compare?

min .04 | Q1 .135 | med .31 | Q3 .59 | Max .99

7. Calculate the IQR. Are there any outliers in the data set?

No outliers. $IQR = Q_3 - Q_1$ $.59 - .135 = .455$

$Q_1 \pm (IQR * 1.5)$

$\frac{.13+.14}{2} = .135$ $\frac{.57+.60}{2} = .59$

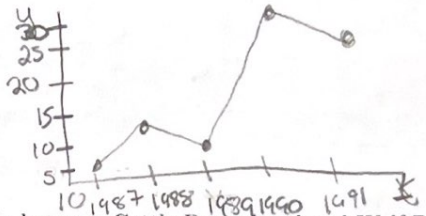
$.135 - (.455 \times 1.5) = -.5475$

$.59 + (.455 \times 1.5) = 1.265$

In the early 1980s, Canadian gray wolves began colonizing the northwestern portion of Montana and by 1987, there were an estimated 10 gray wolves in Montana. With the increase in wolf numbers in the western U.S., there has been a corresponding increase in cattle and sheep depredation due to wolves. Below is tracking data from the years 1987-1991 regarding these wolf populations as well as wolf, cattle, and sheep depredation.

Cattle Depredated	Sheep Depredated	Wolves Killed	Wolf Population	t
6	10	4	10	1987
0	0	0	14	1988
3	0	1	12	1989
5	0	1	33	1990
2	2	0	29	1991

8. Make a time plot for the wolf population year over year (1987-1991). Draw a line across the plot for the mean wolf population.

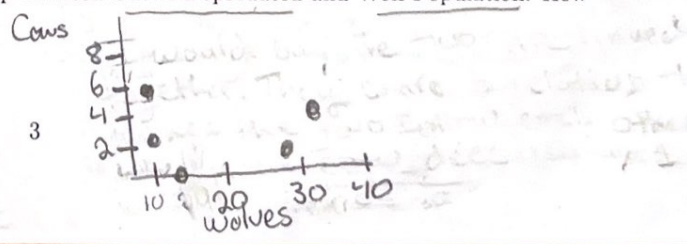


nonlinear

9. Make a scatterplot to observe the relationship between Cattle Depredated and Wolf Population. How would you describe this relationship?

X	Y
10	6
14	0
12	3
33	5
29	2

Nonlinear relationship



Below are summary statistics and a boxplot for a study conducted on schizophrenic and non-schizophrenic individuals. Participants had their reaction times recorded over a series of tests.

Schizophrenics

SAMP

Sum Square Dif.

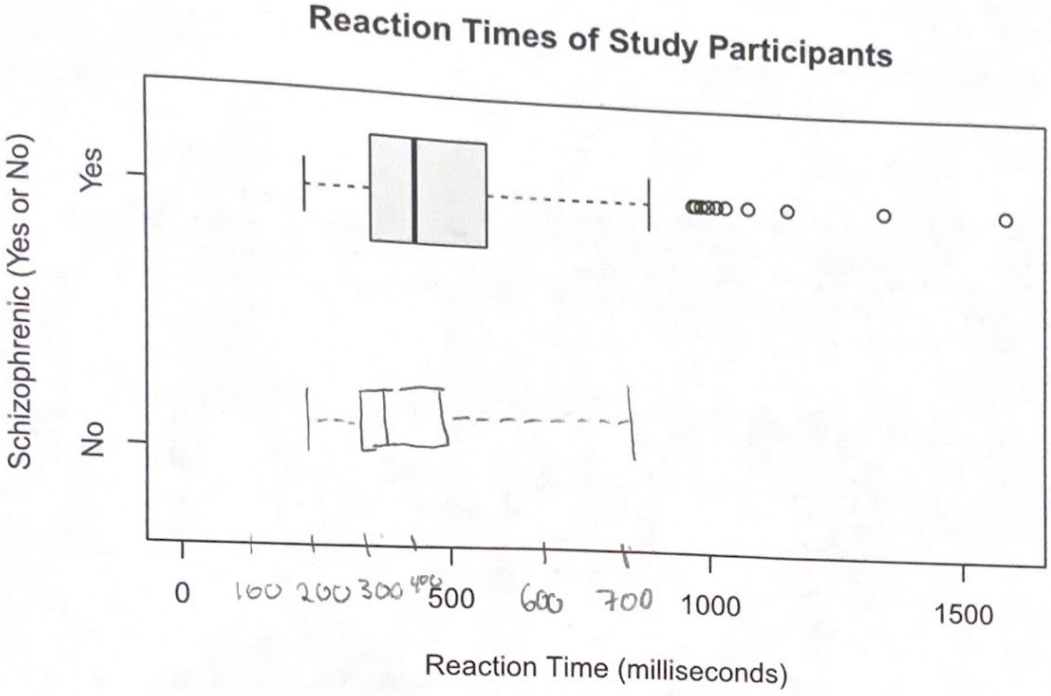
$\sqrt{\frac{SSD}{n-1}}$

n	$\bar{x}$	$\sum(x_i - \bar{x})^2$	Max	Min	Q_1	Q_3	Median
180	506.8667	12366881	1714	226	349	569	432

Non-Schizophrenics

n	$\bar{x}$	$\sum(x_i - \bar{x})^2$	Max	Min	Q_1	Q_3	Median
330	310.1697	1384918	778	204	266	344	303

max - Min



range ⟶ Extremes

10. Calculate the range and standard deviation for both groups. How do they compare?

schizophrenics > non

max-min = 1714 − 226 = 1488 ; $\frac{\sum(x_i-\bar{x})^2}{n-1} = \frac{12366881}{180-1} = \sqrt{69084.7206} = 262.85$

max-min = 778 − 204 = 574 ; $\frac{\sum(x_i-\bar{x})^2}{n-1} = \frac{1384918}{330-1} = \sqrt{4209.477204} = 64.88$

schizophrenic > non

11. Plot the boxplot for the non-schizophrenics. What conclusions can be drawn from comparing your plot with the plot for the schizophrenics?

They are pretty similar but non-schizophrenic has a faster reaction time!