AP STATISTICS **Name:** ROUND ROCK MATH DEPT. **Per:** ∞

Project – Comparing Numerical Distributions – **DUE DATE: M/TU, NOVEMBER 2/3, 2015**

For this assignment, first come up with an investigative question that will allow you to **compare numerical data between two populations**. A few *examples*:

- Who tends to have more Twitter followers, athletes or non-athletes?
- Do females tend to own more pairs of shoes than males?
- Is there a difference in the amount of tips earned per week between male and female restaurant employees?

a) Think of a topic that deals with NUMERICAL DATA, and get **approval from your teacher** before continuing.

There are 2 restaurants named "Mooseburger" and "McTofu". I'm curious to know which restaurant employees tend to make more money at.

b) Write a survey question that you will ask your subjects. The response MUST be numerical data. *(Example: "How many Twitter followers do you have" or "How many pairs of shoes do you own?")*

(For employees of "Mooseburger" or "McTofu")

How much money did you make at work last week?

IMPORTANT: You MUST get approval from your teacher on your survey question before you continue any further!!!

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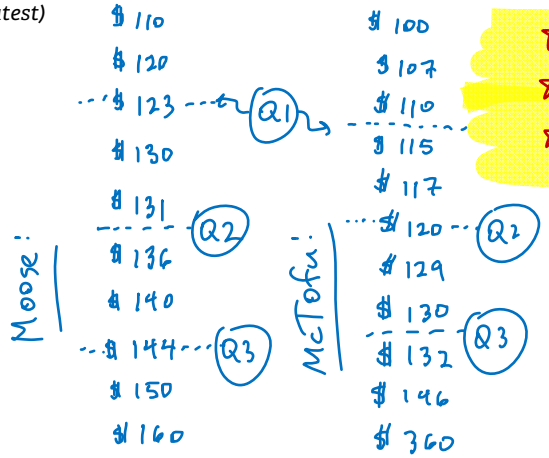
c) Ask your survey question to at least 16 people in each group *(for instance, if you are comparing males and females, then you must survey at least 16 males and 16 females)*.
RECORD YOUR DATA IN THE TABLE ON THE LAST PAGE OF THIS PACKET.

d) Find the five number summary for each of the two samples. *(You may wish to reorder the values in each list from least to greatest)*



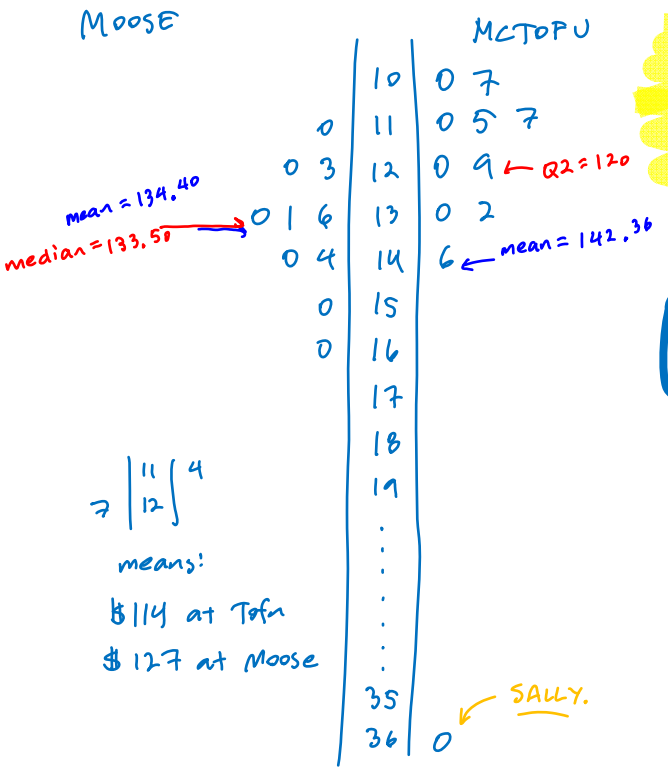
☆ THIS IS JUST AN EXAMPLE!
☆ ACTUAL PROJECTS MUST HAVE AT LEAST 16 VALUES IN EACH GROUP!!!

	Min	Q1	Med	Q3	Max
Moose Burgers:	110	123	133.50	144	160
McTofu:	100	112.50	120	131	360

e) Using a calculator, find the mean and standard deviation for each of the two samples.

	MEAN	ST. DEV.
Moose:	$134.40	$14.86
Tofu:	$142.36	$73.35

f) Create either a back-to-back stemplot OR dot plots to display the data for the two samples. **SHOW THE LOCATION OF BOTH THE MEAN AND THE MEDIAN FOR EACH DISTRIBUTION.**



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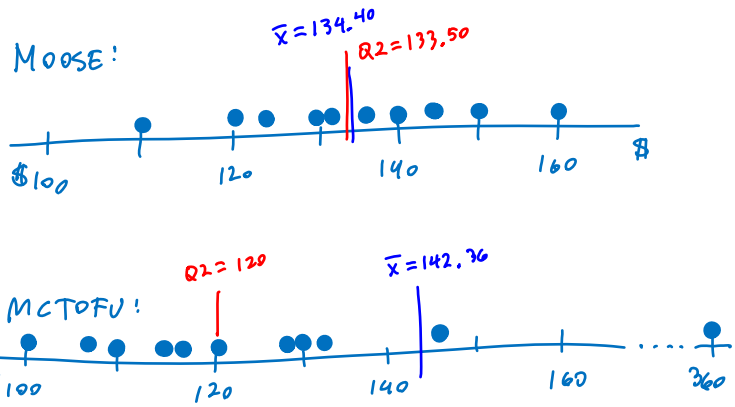


g) Construct parallel box plots to display the data for the two groups. This should include calculations for the 1.5IQR outlier rule for both groups.

Moose: IQR = 144 − 123 = 21

1.5 IQR = 31.5

* Q1 − 1.5 IQR = 123 − 31.5 = 91.5

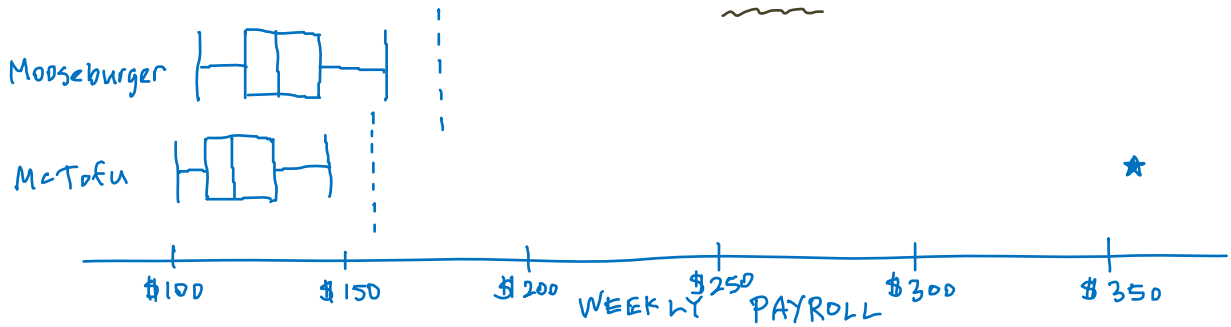
* Q3 + 1.5 IQR = 144 + 31.5 = 175.5

McTofu: IQR = 131 − 112.50 = 18.5

1.5 IQR = 27.75

* Q1 − 1.5 IQR = 112.50 − 27.75 = 84.75

* Q3 + 1.5 IQR = 131 + 27.75 = 158.75



h) Write a few sentences describing and comparing the two distributions. Do there appear to be any significant differences between the two groups?

Mooseburger median ($133.50) is higher than McTofu's Q3 ($131). Also, Mooseburger's Q1 ($123) is higher than McTofu's median ($120). In general, Mooseburger's Q1, median, and Q3 are all higher than the same measures for McTofu. There is one high outlier for McTofu at $360, whereas the distribution of Mooseburger's weekly payroll contains no outliers.

In terms of spread, Mooseburger seems to have a slightly larger IQR and – if you ignore the high outlier for McTofu – a larger overall range than McTofu.

The distribution for Mooseburger appears to be unimodal and roughly symmetric (based on the back-to-back stemplot), while the distribution for McTofu is skewed towards the higher salaries.

If one disregards the high outlier, all of the measures in the 5-number summary are higher for Mooseburger than for McTofu. As a whole, the distribution of weekly payrolls for Mooseburger is higher than that of McTofu.

If I had to pick one restaurant to work for, I would rather work for Mooseburger.

(and on a side note, "McTofu" just doesn't sound as tasty…)

i) For each group, does the mean appear to be a good measure to describe "center"? Or would the median (or something else?) be a better measure of what is "average" in the distribution?

The mean for the salaries at Mooseburgers appears to be a good measure of what is "typical", as the graph is roughly symmetric, and the mean ($134-ish) is very close to the median ($133.50).

For the salaries at McTofu, however, the mean is $142, which is above the median – AND above the Q3! – thanks to the high outlier (Sally?!). In fact there are only two people at McTofu that make more than the mean. In this case, due to the skewness of the distribution of salaries, the median of $120 provides a better measure of the "typical" salary at McTofu.

BEFORE YOU TURN IN YOUR PROJECT:

Double check your work, your graphs, and your explanations.

If your teacher hands your project back to you to make fixes, you will lose points.

DOUBLE-CHECK EVERYTHING!

AP Statistics
Project – Comparing Numerical Distributions

GROUP 1: Mooseburgers

Name (or initials)	$
1. Al	$ 123
2. Boris	136
3. Connie	144
4. Dwight	150
5. Ernie	110
6. Francois	131
7. Gloria	140
8. Horace	160
9. Isaac	120
10. Juan	130
11.	
12.	
13.	
14.	
15.	
16.	

GROUP 2: McTofu

Name (or initials)	$
1. Ken	110
2. Latisha	115
3. Maria	130
4. Nate	100
5. Otto	120
6. Pablo	146
7. Quentin	117
8. Rosa	129
9. Sally	360
10. Ted	132
11. Uta	107
12.	
13.	
14.	
15.	
16.	

☆ NOTE: YOUR PROJECT ☆ REQUIRES AT LEAST 16 people per group!!!