Name: _____ **Section: MAT098/181C-____**

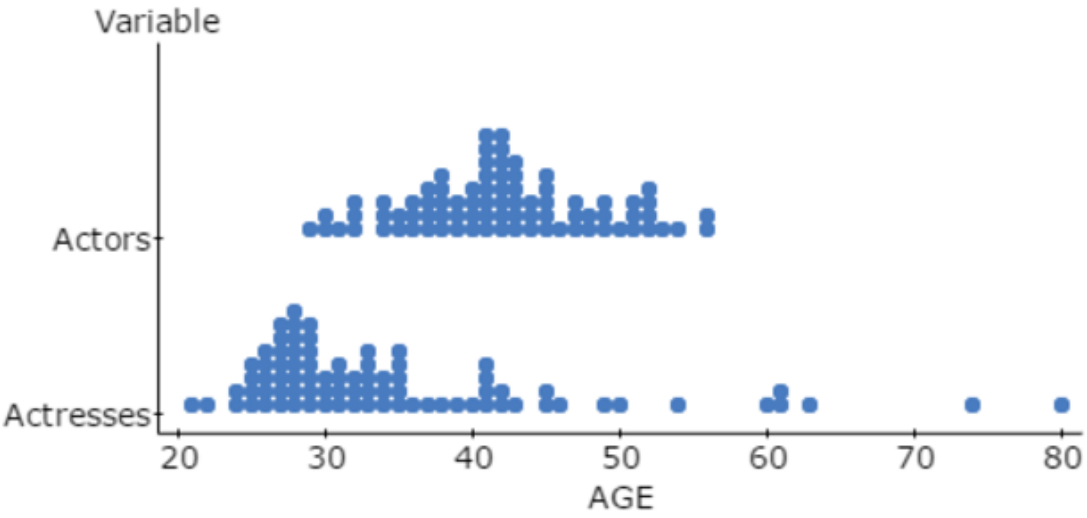
MAT098/181C EXAM #1 (FORM C)

A scientific calculator is permitted. ***Cellphones may not be used as calculators and must be off or on vibrate during the exam****. Show all work on the test or on the work paper provided.*

1. Classify each of the following variables as **categorical** or **quantitative**. *(10 pts)*
   a) Dog breeds _____categorical_____
   b) Time it takes to get to school _____quantitative_____
   c) Number of questions correct on a test _____quantitative _____
   d) Model of car _____categorical_____
   e) Country of birth _____categorical_____
2. 200 adults shopping at a supermarket were asked about the highest level of education they had completed. *(10 pts)*

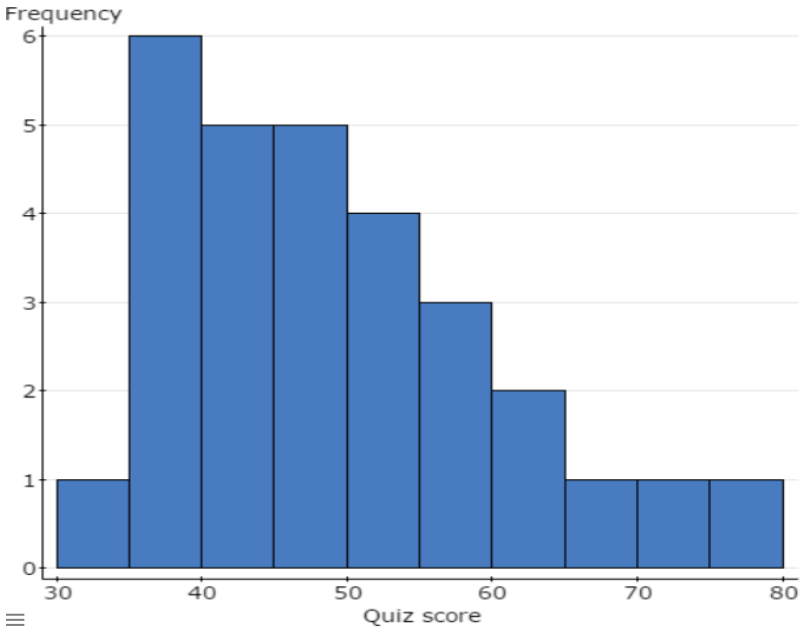
a) Identify the **Individuals** in the study.	a) __adult shoppers_____
b) Identify the **variable** being collected.	b) __level of education_____
c) Is the variable **quantitative** or **categorical**?	c) ___categorical_____
d) What is the **sample size**?	d) _____200_____
e) What is the implied **population** of this study?	e) ___all adult shoppers_____

3. Here are dot plots of the ages of some Oscar winners. Compare the two distributions by comparing **shape**, **center**, and **spread** (overall & typical). Make sure you include units. *(10 pts)*



	Actors	Actresses
shape	**Normal**	**Skewed-right**
center	**About 42**	**About 28**
overall spread	**28-55**	**21-80**
typical spread	**35-50**	**24-35**
Statement: **Actresses tend to be younger than actors with more spread and outliers.**		

4. A group of 29 Statistics students took their first quiz **(80 points total)** and the results are show on the histogram below. *(10 pts)*



a) How would you describe the **shape** of this distribution of exam scores?

Skewed-right

b) Estimate the overall **range** of grades on this exam. (range = max – min)

$$\textbf{range} = 80 - 30 = 50$$

c) What percentage of the students passed the exam with a score of 50 points or above?

$$\frac{4+3+2+1+1+1}{29} = \frac{12}{29} \approx 41\%$$

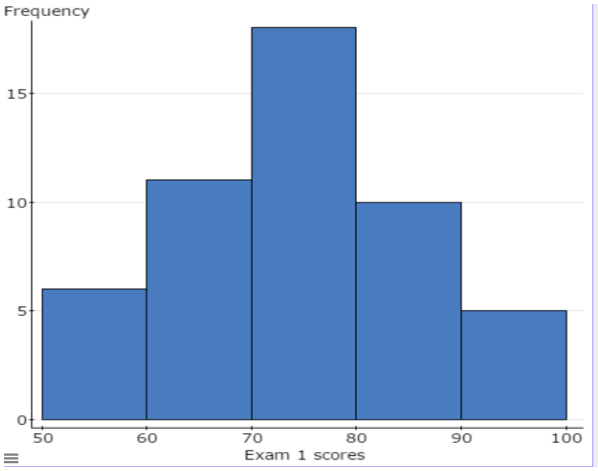
d) What percentage of the students made an A or a B (65 points or higher)?

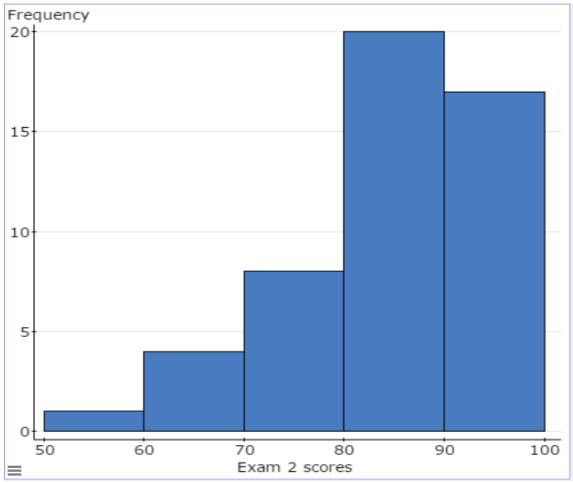
$$\frac{1+1+1}{29} = \frac{3}{29} \approx 10\%$$

e) What percentage of the students who passed the exam (with 50points or better) made an A or a B? *(round to the nearest percent)*

$$\frac{3}{12} \approx 25\%$$

5. Pick the statement that you think is most strongly supported by the data. *(10 pts)*





A. Students were better prepared for Exam 2 than for Exam 1?

B. Students were equally prepared for both exams.

For the statement you picked, support it with <u>at least three</u> precise observations from the histograms. Explain how your observations support the statement you chose.

(1) The median score for Exam 2 is higher than for Exam 1.

(2) The typical range for Exam 2 is 75-100 compared to Exam 1 which is 50-100.

(3) Larger percent of students passed Exam 2 with higher grades than those on Exam 1.

6. Round your final answer to one decimal place. Use the standard deviation formula

$$s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} \qquad \text{or} \qquad s = \sqrt{\frac{n(\sum x^2) - (\sum x)^2}{n(n-1)}}$$

to find the **standard deviation** of the mean scores of four different statistics exams: 85, 87, 88, 92. What does it tell you about the variability of number of students in these statistics classes? *(10 pts)*

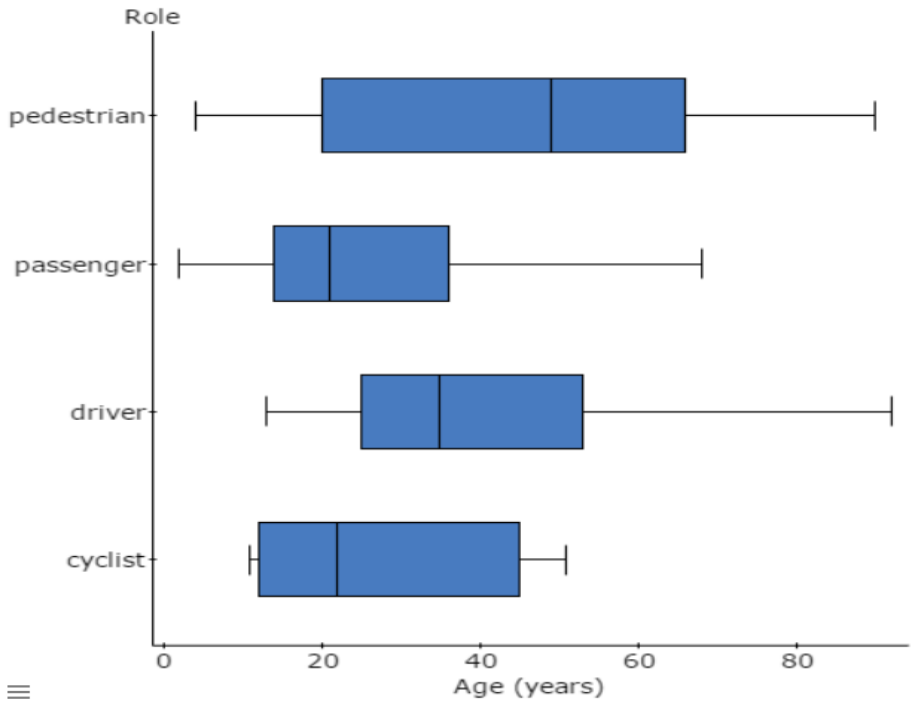
x	$x-\bar{x}$	$(x-\bar{x})^2$

S=2.94

or

x	x^2
$\sum x =$	$\sum x^2$

7. The boxplots show the age of people involved in accidents according to their role in the accident.: *(15 pts)*



a) Which role involved the youngest person?

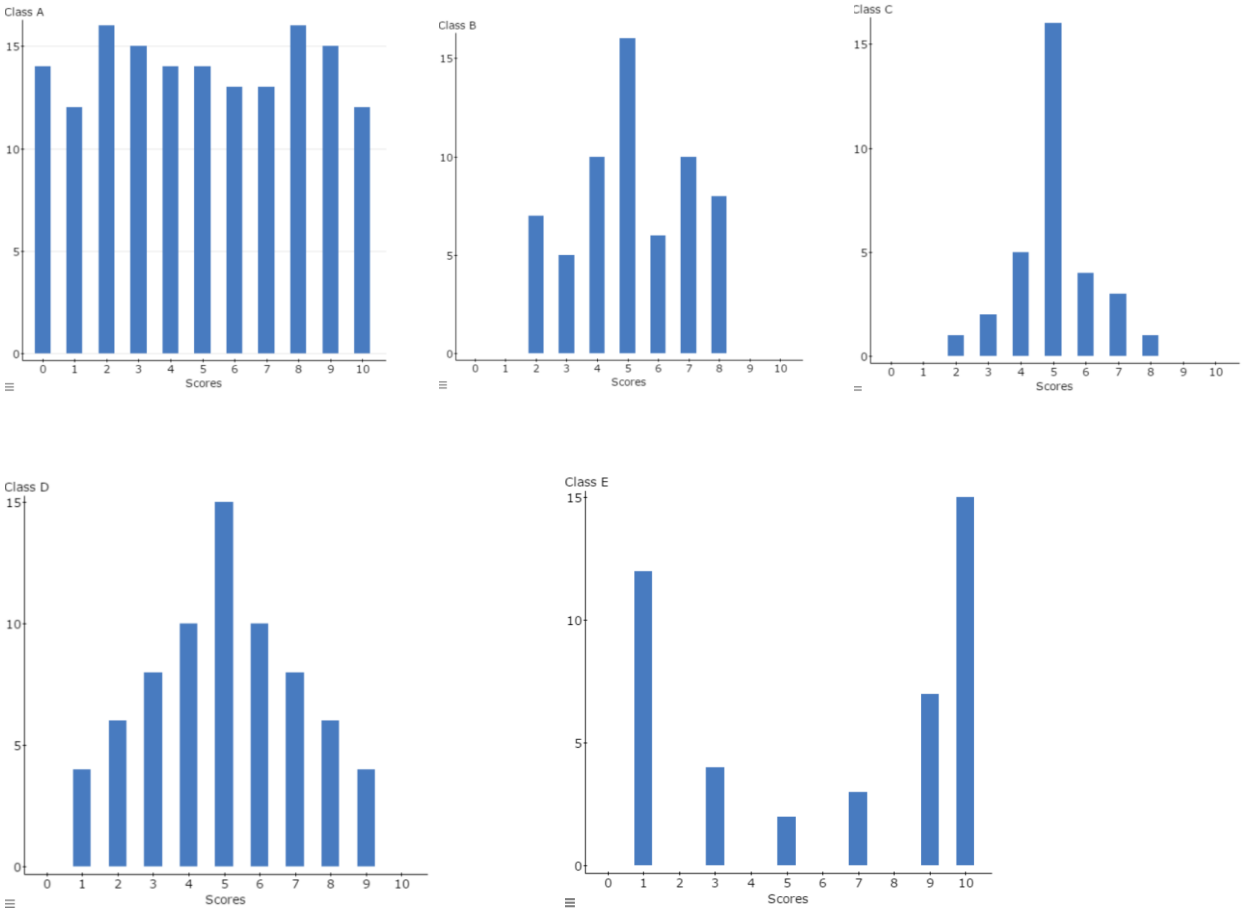
Passenger.

b) Which two roles had the oldest people involved?
Pedestrian and driver.

c) Which two roles had median ages older than 30?
Driver and pedestrian.

d) Which role had the largest IQR?
pedestrian.

8. Please answer the following multiple choice questions *(5 pts)*
Items a) and b) refer to the five histograms below: Each histogram displays test scores for a different statistics class. The test scores range from 0 to 10 points.



a) Which of the classes would you expect to have the lowest standard deviation?

A. Class E, because it has the smallest number of distinct scores.
B. **Class C**, because it has the most values close to the mean
C. Class A, because it has a uniform distribution
D. Class B and Class C, because they both have the smallest range.
E. Class D, because it looks the most symmetrical.

b) Which of the classes would you expect to have the highest standard deviation?

A. Class C, because it has the largest difference between the heights of the bars.
B. Class A, because it has the largest number of different scores.
C. Class B, because the distribution is very bumpy and irregular.
D. **Class E**, because more of its scores are far from the mean.
E. Class D, because it has a large range and looks symmetrical.

9. Calculate an interval of **typical measurements** using the mean and the standard deviation (mean ± SD) for BMI of beauty pageant winners. *(5 pts)*

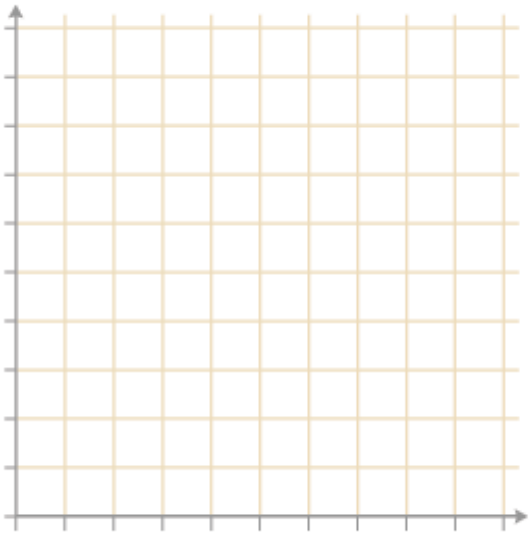
1920-1930-: (18.63, 21.77)
2000-2010: (17.08, 19.12)

BMI of beauty pageant winners	Mean	SD
1920-1930	20.2	1.57
2000-2010	18.1	1.02

10. Sixteen teenagers were asked how many true friends they have. The results of the survey are listed below. Make a frequency table and histogram to display the data. *(15 pts)*

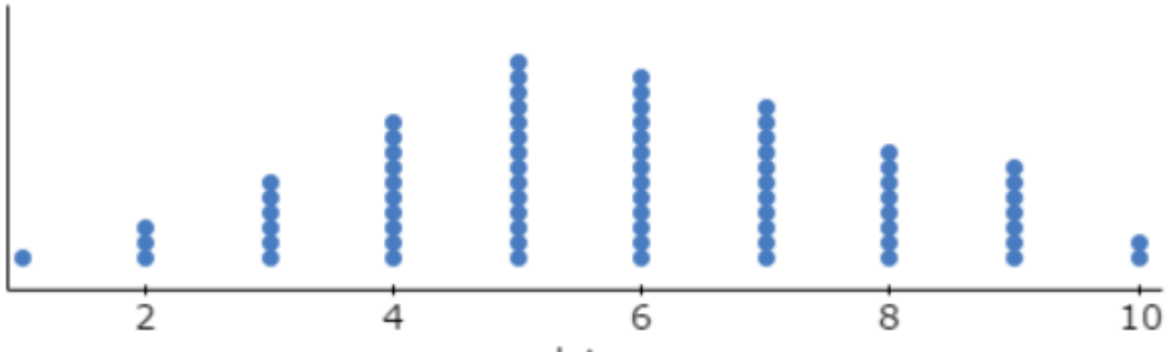
0,5,10,15,24,7,13,9,8,1,9,11,3,15,6,5

Class	Frequency	Relative Frequency	Class Boundaries lower -- upper
0-4	**3**	**19%**	**-0.5 – 4.5**
5-9	**7**	**44%**	**4.5 – 9.5**
10-14	**3**	**19%**	**9.5 – 14.5**
15-19	**2**	**13%**	**14.5 – 19.5**
20-24	**1**	**6%**	**19.5 – 24.5**



**Extra Credit:

1. For this data set, should median or mean be used to describe the center? Why? *(3 pts)*



Mean because the shape is symmetric and there are no outliers that will affect the mean.

2. The distribution of heights of women at BHCC is approximately symmetrical in shape with a **mean** of 161cm and a **standard deviation** of 4cm. According to the *standard deviation rule*, almost 2.5% of the women at BHCC are shorter than what height? *(2 pts)*

$$x = -2(4) + 161$$

$$x = 153\ cm$$