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

MAT098/181C EXAM #1 (FORM A Key)

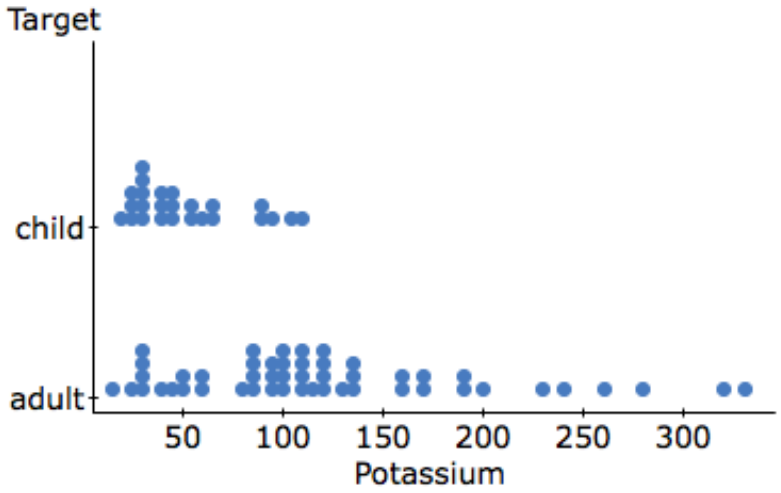
A scientific calculator is permitted. ***Cellphones may not be used as calculators and must be off or on vibrate during the exam****. Show all work on the test or on the work paper provided.*

1. Classify each of the following variables as **categorical** or **quantitative**. *(10 pts)*
   a) Years of education ____**quantitative**_____
   b) A person's gender ____**categorical**_____
   c) Daily intake of whole grains (measured in grams per day) ___**quantitative**_____
   d) Number of vending machines at BHCC _____**quantitative** _____
   e) Whether a student is prepared for class ____**categorical**_____

2. A survey of 300 BHCC students was conducted, and they were asked to respond with the number of classes they were currently taking. *(10 pts)*

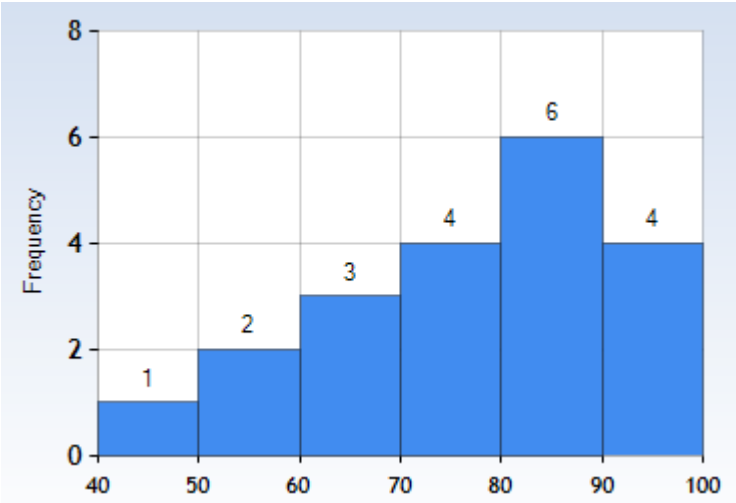
a) Identify the **Individuals** in the study.	a) **BHCC students**
b) Identify the **variable** being collected.	b) **number of classes taking**
c) Is the variable **quantitative** or **categorical**?	c) **quantitative**
d) What is the **sample size**?	d) **300**
e) What is the implied **population** of this study?	e) **All BHCC students**

3. Here are dot plots of the Potassium content for some child cereals and adult cereals. Compare the two distributions by comparing **shape**, **center**, and **spread** (overall & typical). Make sure you include units. *(10 pts)*



	child cereals	adult cereals
shape	**Skewed-right**	**Skewed-right**
center	**about 50**	**about 110**
overall spread	**about 0 to 120**	**about 0 to 350**
typical spread	**about 20 to 50**	**about 80 to 120**
Statement: **Adult cereals typically have more potassium then children cereals according to the data.**		

4. A group of 20 Pre-Statistics students took their first exam 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-left

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

$$\textbf{range} = 100 - 40 = 60$$

c) What percentage of the students passed the exam with a 70 or better?

$$\frac{4+6+4}{20} = \frac{14}{20} = 70\%$$

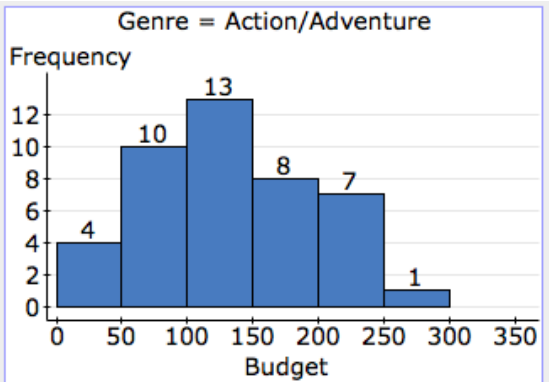
d) What percentage of the students made an A or a B?

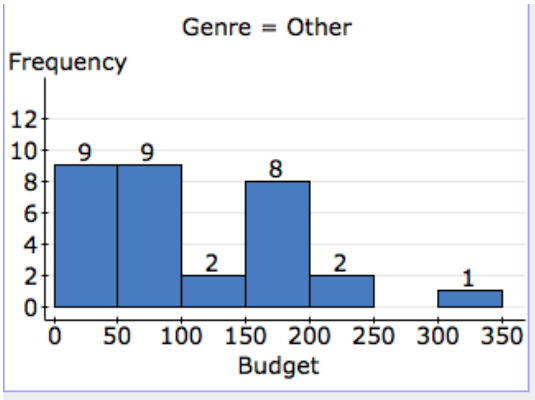
$$\frac{6+4}{20} = \frac{10}{20} = 50\%$$

e) What percentage of the students who passed the exam (with 70 or better) made an A or a B? *Round to the nearest percent.*

$$\frac{10}{14} \approx 71\%$$

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





A. Action/Adventure movies tend to have larger budgets than other movies.

B. Budget amounts are similar for Action/Adventure movies and other movies.

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 budget for Action/Adventure movies is larger.

(2) The typical range for Action/Adventure movies is 50-150 compare to Other with 0-100.

(3) Larger percent of Action/Adventure movies have budget 100 or more.

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

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

to find the **standard deviation** of the number of students in four different statistics classes: 22, 22, 26, 24. What does it tell you about the variability of number of students in these statistics classes? *(10 pts)*

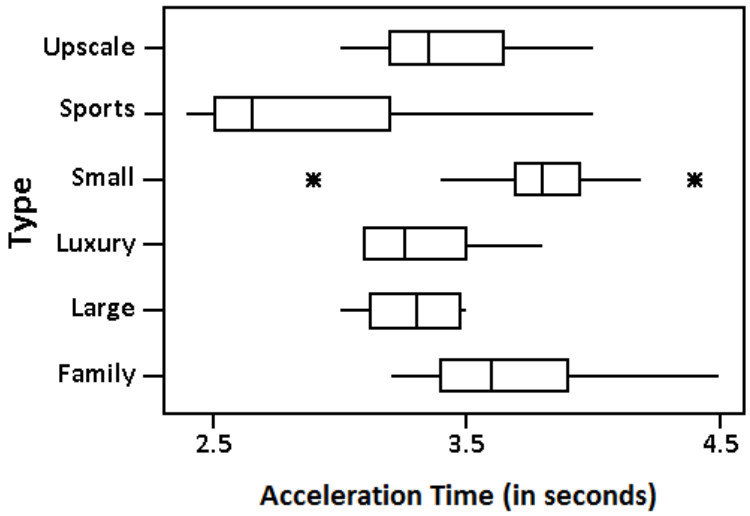
x	$x - \bar{x}$	$(x - \bar{x})^2$

$s = 1.9$

or

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

7. The 1999 Consumer Reports New Car Buying Guide reported on the number of seconds required for a variety of cars to accelerate from 0 to 30 mph. The cars were also classified into six categories according to type. The following boxplots display the distribution of acceleration times for each type of car: *(15 pts)*



a) Which type of car had the lowest acceleration time recorded?

Sports.

b) Which <u>two</u> types of cars had the highest acceleration times recorded?

Small and family.

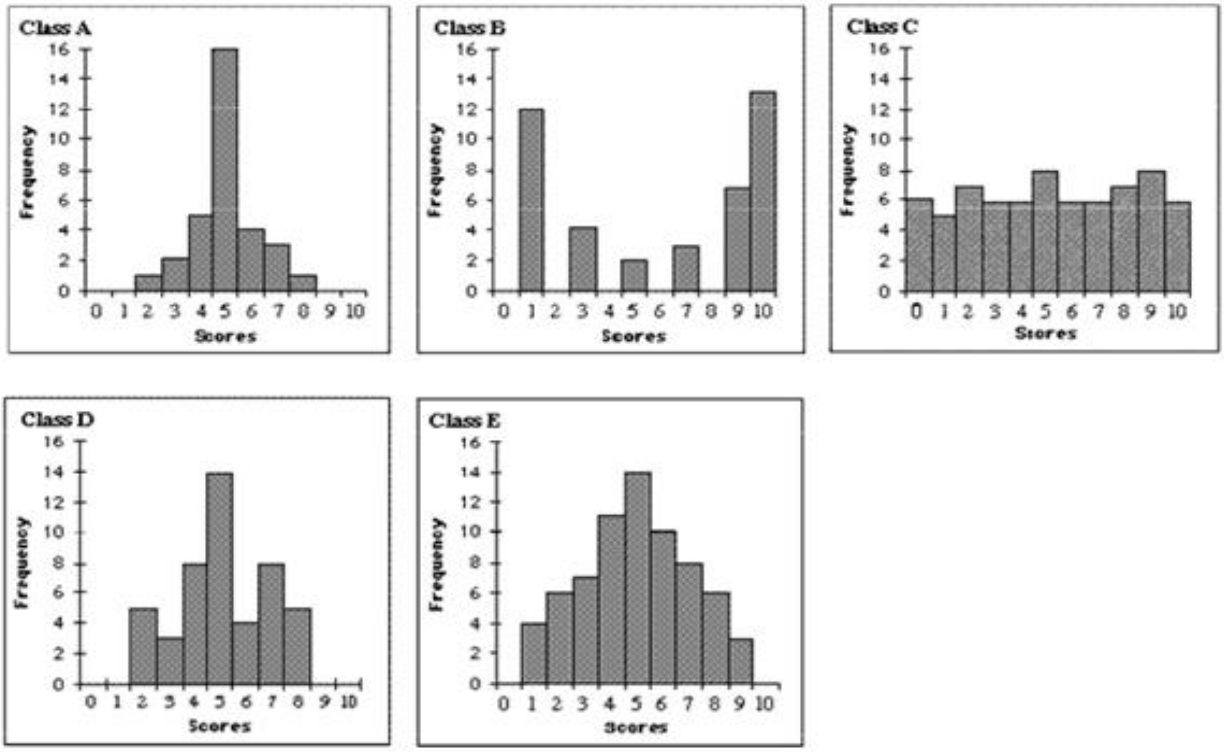
c) Which <u>two</u> types of cars had median acceleration times above 3.5 seconds?

Small and family.

d) Which type of car had the largest percentage of its acceleration times above 3.5 seconds?

Small has more than 75% of its acceleration times above 3.5 seconds.

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

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

A. Class A, because it has the largest difference between the heights of the bars.
B. **Class B**, because more of its scores are far from the mean.
C. Class C, because it has the largest number of different scores.
D. Class D, because the distribution is very bumpy and irregular.
E. Class E, 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 males and females. *(5 pts)*

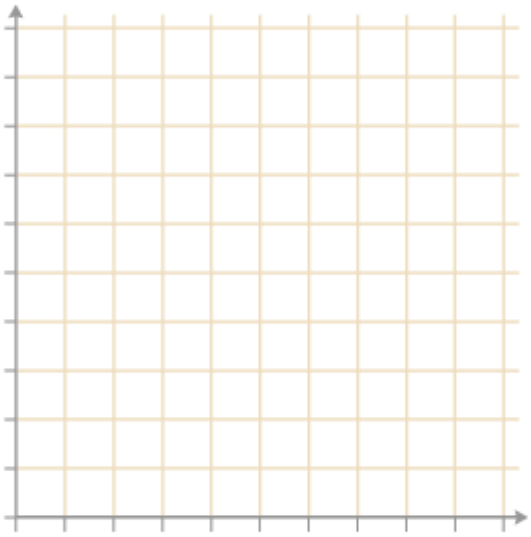
Male: (91.5 cm, 104.1 cm)
Female: (88.9 cm, 102.5 cm)

Gender	Mean	SD
Male	97.8 cm	6.3 cm
Female	95.7 cm	6.8 cm

10. Fifteen people were asked to state the number of hours they exercise in a seven-day period. The results of the survey are listed below. Make a frequency table and histogram to display the data. *(15 pts)*

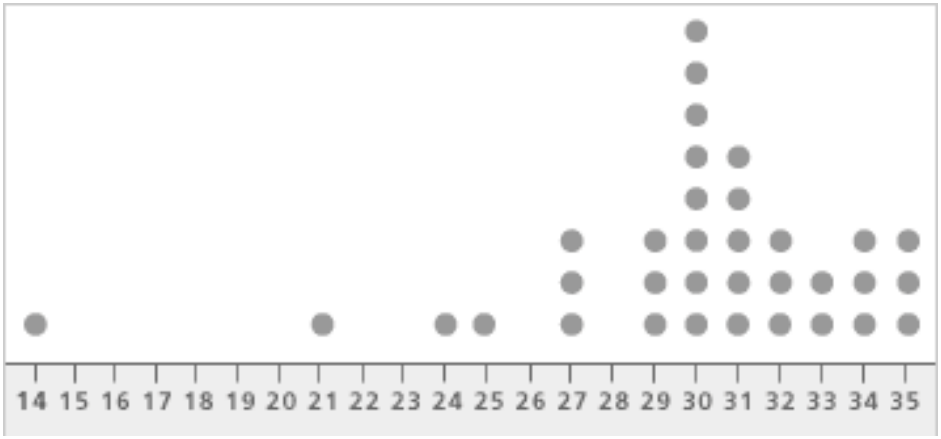
0, 0, 8, 2, 4, 7.5, 10, 11, 5, 6, 8, 12, 11, 9, 6.5

Class	Frequency	Relative Frequency	Class Boundaries lower -- upper
0-2	**3**	**20%**	**-0.5 – 2.5**
3-5	**2**	**13%**	**2.5 – 5.5**
6-8	**5**	**33%**	**5.5 – 8.5**
9-11	**4**	**27%**	**8.5 – 11.5**
12-14	**1**	**7%**	**11.5 – 14.5**



**Extra Credit:

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



Median because the shape is skewed-right and there is an outlier that will affect the mean to be higher. We only use mean when the shape is about symmetric.

2. The distribution of the amount of money spent by students for textbooks in a semester is approximately normal in shape with a **mean** of $235 and a **standard deviation** of $20. According to the *standard deviation rule*, almost 2.5% of the students spent more than what amount of money on textbooks in a semester? *(2 pts)*

$$\frac{x - 235}{20} = 2$$

$$x = \$275$$