Three professors at KFUPM compared two different approaches to teaching courses in the school of business. At the time of the study, there were 250 students in the business and 92 students were involved in the study. Demographic data collected on these 92 students included class (freshman, sophomore, junior, senior), age, gender, major and the GPA.

Based on the above information, solve the next 8 questions

1. Methods that result in decisions concerning population characteristics based only on the sample results are called

   A. Statistical Inference
   B. Population
   C. Sample
   D. Parameter
   E. Statistic

2. The 250 students in the business students constitute the

   A. Population
   B. Sample
   C. Parameter
   D. Statistic
   E. Statistical Inference

3. The 92 students who will participate in this study constitute the

   A. Sample
   B. Population
   C. Parameter
   D. Statistic
   E. Statistical Inference

4. the average GPA calculated using 250 students GPA's is

   A. Parameter
   B. Sample
   C. Population
   D. Statistic
   E. Statistical Inference

5. the average GPA calculated using 92 student's GPA's is

   A. Statistic
   B. Parameter
   C. Population
   D. Sample
   E. Statistical Inference

6. Which of the variables listed are considered to be ratio level data?

   A. Age and the GPA
   B. Gender and major
   C. Only the Age
   D. Only the GPA
   E. Only the class

7. Which of the variables would be classified as nominal level data?

   A. Gender and major
   B. Age and the GPA
   C. Only the gender
   D. Only the major
   E. Only the class

8. Which of the variables would be considered to be ordinal data?

   A. Only the class
   B. Gender and major
   C. Age and the GPA
   D. Only the gender
   E. class, age, gender, major and the GPA

The following table provides the summary based on a recent survey that asked people where they prefer to spend their summer vacations. The most common preferences are with the respective percentages are given as:

Vacation preference	Percentage (%)
USA	19
UK	10
Australia	15
Canada	24
Europe	32

Based on the above information, solve the next 2 questions

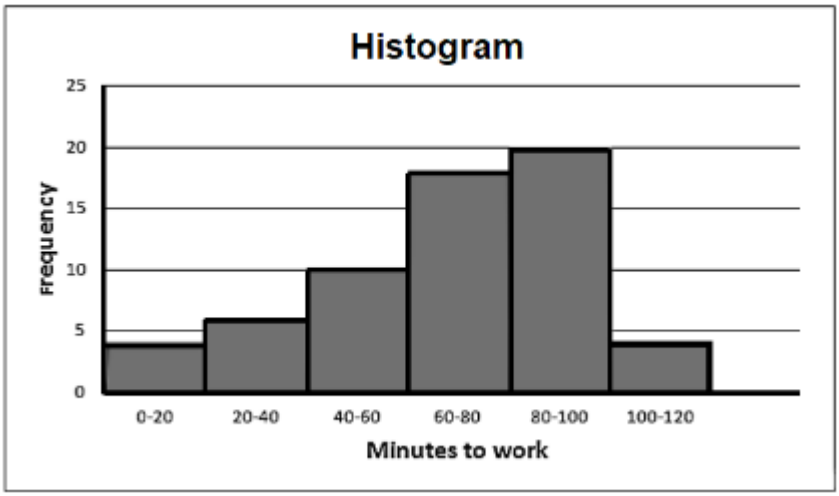
9. The suitable measure of central tendency.

   A. The mode
   B. The mean
   C. The median
   D. The mean and the median
   E. All the mean, the median and the mode

10. To construct a pie chart the largest angle will be for

   A. Europe
   B. USA
   C. UK
   D. Canada
   E. Australia

Below histogram shows number of employees and their time (in minutes) to work



based on the above information, solve the next 3 questions

11. The percentage of employees who arrive at work in more than 100 minutes is

A. Approximately 6%
B. Approximately 10%
C. Approximately 16%
D. Approximately 29%
E. Approximately 94%

Interval	midpoint	Freq.	Percentage	Cum. Freq.	xf
0 – 20	10	4	6%	4	40
20 – 40	30	6	10%	10	180
40 – 60	50	10	16%	20	500
60 – 80	70	18	29%	38	1260
80 – 100	90	20	32%	58	1800
100 - 120	110	4	6%	62	440
	total	62			4220

12. Number of employees who arrive in less than half hour is

A. 4
B. 6
C. 10
D. 20
E. 52

13. The estimated average time for an employee to arrive to work is equal to _____

A. Approximately 68 minutes
B. Approximately 6 minutes
C. Approximately 60 minutes
D. Approximately 90 minutes
E. Approximately 75 minutes

$$\bar{x} = \frac{4220}{62} = 68.06$$

A bank branch located in a commercial district of a city has developed an improved process for serving customers during the noon-to-1:00 p.m. lunch period. The waiting time, in minutes (defined as time the customer enters the line to when he or she reaches the teller window), of a sample of 15 customers during this hour is recorded over a period of one week.

6.79	6.46	6.19	6.1	5.55	5.54	5.13	5.12
4.77	4.5	4.21	3.2	3.02	2.34	0.38	

based on the above information, solve the next 4 questions

14. The estimated average waiting time is equal to

A. 4.62 minutes
B. 5 minutes
C. 6.1 minutes
D. 5.12 minutes
E. 3.2 minutes

$$\bar{x} = \frac{\sum x}{n} = 4.62$$

15. The standard deviation of the waiting time equal to

A. 1.75 minutes
B. 3.07 minutes
C. 2.86 minutes
D. 1.69 minutes
E. 6.55 minutes

$$s = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n-1}} = 1.75109$$

16. The percentage of the waiting time fall within the one standard deviation equal to

A. 73.33%
B. 68%
C. 86.67%
D. 80%
E. 66.67%

$$(\bar{x} - s, \bar{x} + s) = (2.868, 6.371)$$

Number of values in the interval $= 11$ and Percentage of the values in the interval $= \frac{11}{15} = 73.33\%$

17. Which of the following is not true?

A. Since the mean is more than the median, the data skewed to the right
B. The s-score for the minimum value is – 2.42.
C. The s-score for the maximum value is 1.23.
D. The median equal to 5.12
E. The is no outliers.

The median equal to 5.12 which is more than the mean, the data skewed to left not to right.

$Z_{min} = \frac{0.38-4.62}{1.75109} = -2.4213$ & $Z_{max} = \frac{6.79-4.62}{1.75109} = -1.239$

18. Ahmed's grades on his 1st 4 quizzes are 90, 85, 92, and 87. What score must he get on the 5th quiz to make his average 90?

A. 96
B. 100
C. 90
D. 87
E. 92

$$\bar{x} = 90 = \frac{90 + 85 + 92 + 87 + x}{5}$$
$$x = 450 - 354 = 96$$

19. Suppose that each day laboratory technician A completes 40 analyses with a standard deviation of 5. Technician B completes 160 analyses per day with a standard deviation of 15. Which of the following statements is true?

A. Technician B, who has more absolute variation in output than technician A, has less relative variation.
B. Technician A, who has less absolute variation in output than technician B, has less relative variation.
C. Technician B, who has more absolute variation in output than technician A, has more relative variation.
D. Technician A, who has more absolute variation in output than technician B, has less relative variation.
E. Both technician has the same relative variation

$$CV_A = \frac{5}{40} = 12.5\% \quad \& \quad CV_B = \frac{15}{160} = 9.4\%$$

Technician B, who has more absolute variation in output than technician A,
Technician B has less relative variation

20. A population of 2-liter bottles of cola is known to have a mean fill-weight of 2.06 liters and a standard deviation of 0.02 liters. The population is known to be bell-shaped. What proportion of the observations is between 2.02 and 2.10?

A. 95%
B. 75%
C. 99.7%
D. 50%
E. 68%

Since the population known to be bell- shaped, within 2 standard deviations from the mean (i.e. between $2.02\ and\ 2.1$) about 95%