Classifying variables

Information

Questions 1 - 3 refer to the following:

Students in an introductory statistics course were asked a series of questions as part of a class survey. What is the type of variable for the responses to each of the following questions?

Question 1 (1 point)

What is your gender?

Question 1 options:

○   A) Quantitative

○   B) Categorical and Nominal

○   C) Categorical and Ordinal

Question 2 (1 point)

On average, how many hours of sleep do you get per night?

Question 2 options:

○   A) Categorical and Nominal

○   B) Quantitative

○   C) Categorical and Ordinal

Question 3 (1 point)

What is your bedtime: 8pm - 10pm, 10pm - 12am, 12am - 2pm, or after 2am?

Question 3 options:

○   A) Categorical and Nominal

○   B) Categorical and Ordinal

○   C) Quantitative

Question 4 (2 points)

STAT 1000 and STAT 2000 are the first-year and second-year introductory statistics courses at the U of M. A STAT 2000 instructor prepares a histogram of the STAT 2000 midterm scores of all students who had STAT 1000 final exam scores over 75%. The horizontal and vertical axes represent, respectively:

Question 4 options:

    ○   A) STAT 1000 final exam score and frequency

    ○   B) STAT 1000 final exam score and STAT 2000 midterm score

    ○   C) STAT 2000 midterm score and STAT 1000 final exam score

    ○   D) Student name and STAT 2000 midterm score

    ○   E) STAT 1000 midterm score and frequency

Question 5 (2 points)

The following histogram displays the taxi fares of the last 50 rides given by a driver:
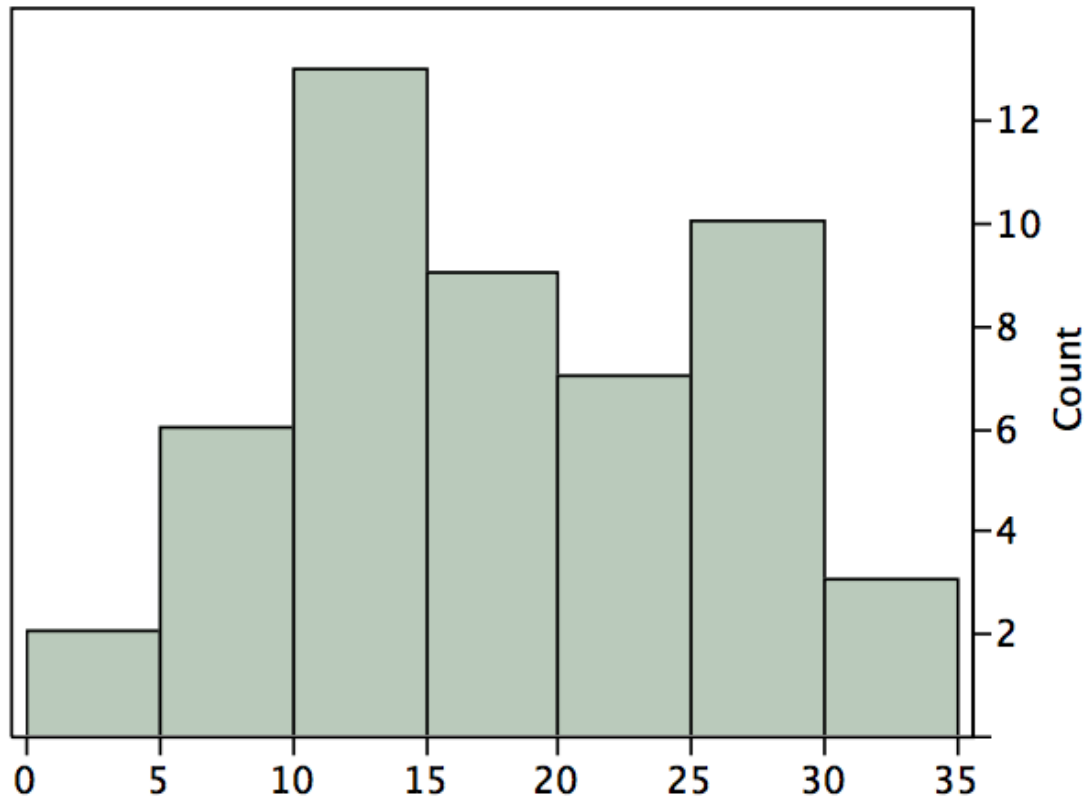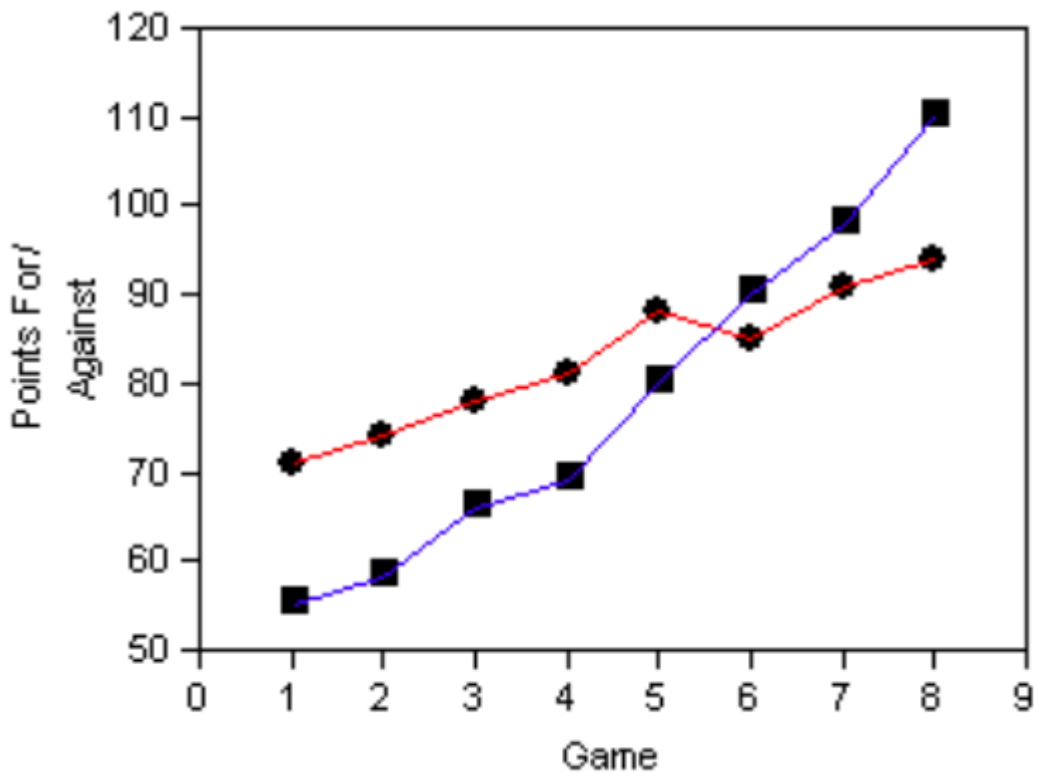

What percentage of fares are less than $10.00?

Question 5 options:

○   A) 8%

○   B) 12%

○   C) 16%

○   D) 20%

Information

Questions 6 - 8 refer to the following:

A basketball team has played eight games so far this season. This time plot displays the number of points scored by the team (red line) and the number of points their opponents scored against them (blue line).

Determine if each of the following statements are true or false.

Question 6 (1 point)

There is an upward trend in the number of points the team has scored per game.

Question 6 options:

   ○   A) True

   ○   B) False

Question 7 (1 point)

The lines cross at one point, which means the team has tied one game.

Question 7 options:

   ○   A) True

   ○   B) False

Question 8 (1 point)

The team has won five games and lost three.

Question 8 options:

   ○   A) True

   ○   B) False

Question 9 (2 points)

The mean salary of the seven employees of a small business is $53,000 per year. One employee, whose salary was $71,000, was fired. Three new employees, who will each be paid a salary of $59,000, are hired. What is the new mean annual salary of the employees of the business?

Question 9 options:

   A) $51,000

   B) $52,000

   C) $53,000

   D) $54,000

   E) $55,000

Question 10 (2 points)

After completing all of the term work except the final exam, a student is trying to figure out what score she needs on the final exam to get a B+ in the course. A student must have a final grade of 75% to get a B+ in the course.

The coursework is weighted as follows:

Midterm exam: 25%

Assignments: 15%

Project: 10%

Final exam: 50%

The student's score on the midterm exam was 72%, her score on assignments was 80%, and her score on the project was 94%. What percent score does the student need on the final exam to end up with a final grade of 75% in the course? Give your answer with 1 decimal place.

Your Answer:

Question 11 (1 point)

The weights of 47 giant pumpkins entered into a competition at an agricultural fair are summarized in the following frequency distribution:

Weight	Number of Pumpkins
200-300	2
300-400	3
400-500	3
500-600	5
600-700	12
700-800	15
800-900	7

The variable being studied here is **weight of pumpkin**. We don't have the actual data values of the weights of the pumpkins, so it's impossible to calculate the mean value or the median value exactly. However, based on the **shape** of the distribution, we do know with certainty that either the mean or the median is larger than the other. Which one is larger?

Question 11 options:

○ A) Median

○ B) Mean

Question 12 (1 point)

The shower flow rates (in L/min) for a sample of 30 houses are ordered and shown below:

2.2	2.8	3.8	4.2	4.6	5.0	5.7	6.0	6.2	6.2
6.5	6.5	6.7	6.8	7.0	7.2	7.3	7.4	7.4	7.6
7.7	7.9	8.0	8.1	8.5	8.6	8.7	8.8	8.8	9.7

Find the interquartile range for this data set.

Your Answer:

Question 13 (2 points)

A researcher recorded the duration of storms in Tampa Bay, Florida one year. A frequency distribution of the duration of the storms (in minutes) is shown below:

Duration	Frequency
0-25	5
25-50	13
50-75	16
75-100	25
100-125	14
125-150	10
150-175	6
175-200	5
200-225	3
225-250	1
250-275	1

Which interval contains the third quartile of data values?

Question 13 options:

○ A) 100-125

○ B) 125-150

○ C) 150-175

○ D) 175-200

○ E) Impossible to determine

Information

Questions 14-16 refer to the following:

Data on highway fuel economy (in miles per gallon) were obtained for several American, Asian and European automobiles produced in 2008. The data are displayed in the side-by-side boxplots below.
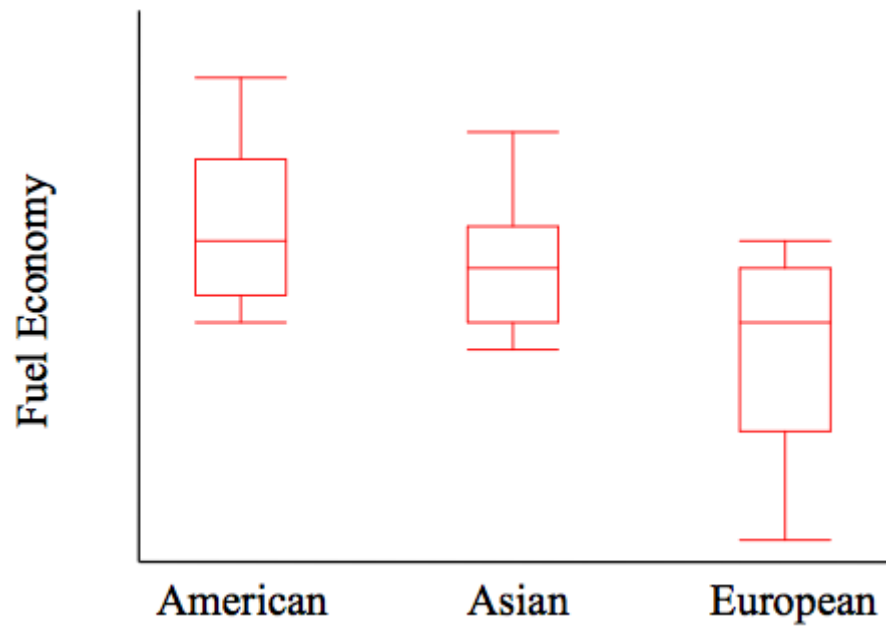
Determine if each of the following statements are true or false.

Question 14 (1 point)

25% of Asian cars have fuel economies greater than the most fuel-efficient European car.

Question 14 options:

    ○   A) True

    ○   B) False

Question 15 (1 point)

The distribution for American cars is the most variable.

Question 15 options:

    ○   A) True

    ○   B) False

Question 16 (1 point)

The distribution for European cars is skewed to the right.

Question 16 options:

    ○   A) True

    ○   B) False

Information

Questions 17 and 18 refer to the following:

The following are the weights (in pounds) of 54 university males:

137 140 142 143 148 149 149 150 150

152 152 154 156 157 157 157 158 158

158 159 159 160 161 162 162 162 162

164 165 165 165 165 165 166 166 166

167 167 167 168 168 170 172 172 173

174 174 175 177 180 181 183 184 193

Question 17 (2 points)

If we construct an outlier boxplot for weights, which values would be identified as outliers?

(Select all that apply. If your answer is not completely correct, no partial credit will be given.)

Question 17 options:

☐   There are no outliers.

☐   137

☐   140

☐   142

☐   143

☐   180

☐   181

☐   183

☐   184

☐   193

Question 18 (2 points)

If we constructed an outlier boxplot for this data set, the lines coming out of the box (the whiskers) would extend to which values?

Question 18 options:

○   A) 147 and 180

○   B) 140.5 and 184.5

○   C) 140 and 193

○   D) 142 and 184

○   E) 137 and 193

Question 19 (2 points)

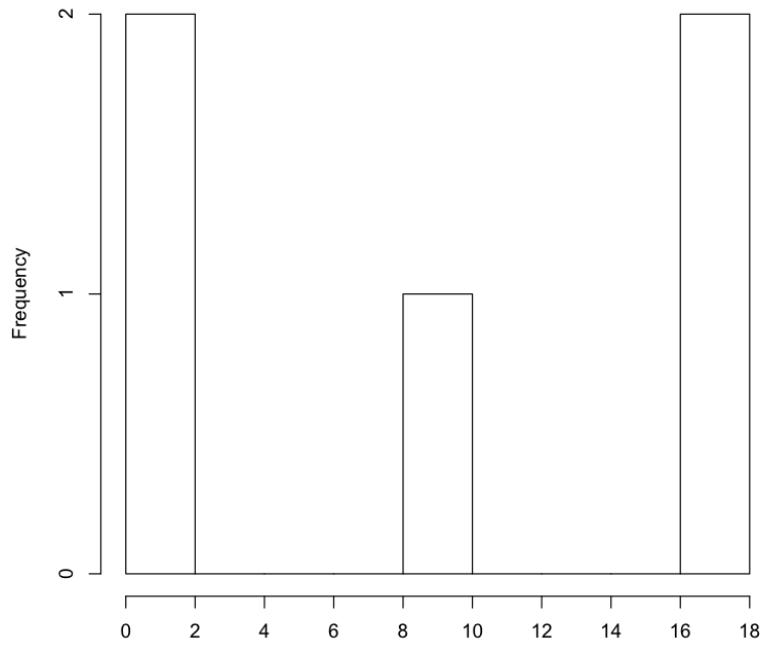Calculate the standard deviation of the following numbers:

6   10   3   7   4

Question 19 options:

○   A) 2.74

○   B) 3.06

○   C) 7.50

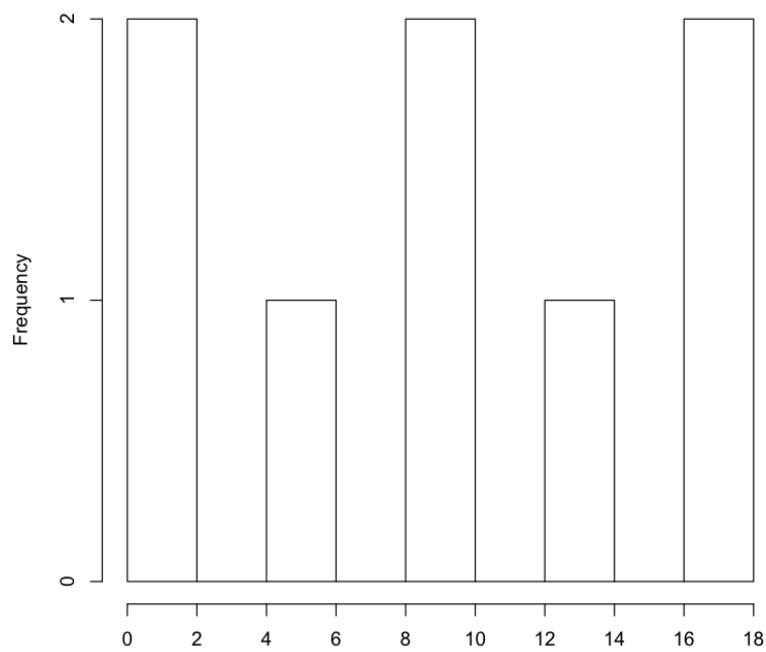○   D) 2.45

○   E) 3.37

Question 20 (1 point)

A histogram is constructed from each of two data sets, as pictured below.

Data set A:

Data set B:

Which data set has the smaller standard deviation?

Question 20 options:

○   A) Data set A

○   B) Data set B

Question 21 (1 point)

The five-number summary for the weights of a random sample of 30 hockey players is as follows:

180   190   200   210   230

The mean and standard deviation are calculated to be $\bar{x}$ = 205 pounds and s = 15 pounds.

It was later discovered that a player, whose weight is actually 170 lbs, was recorded as 180 lbs, and another player whose weight is actually 240 pounds, was recorded as 230 lbs. The value(s) of which of the following measures will change after the corrections are made?

I. mean

II. median

III. standard deviation

Question 21 options:

○   A) I only

○   B) II only

○   C) III only

○   D) I and III only

○   E) II and III only