Outliers

Name: _____   **Date:** _____

1. The number of carbohydrates in a one-ounce serving of thirteen breakfast cereals is listed as follows: 19, 26, 25, 24, 23, 26, 23, 21, 28, 23, 13, 25 and 20 units.

   What is the lower extreme?

   A. 13   B. 20   C. 21.5   D. 28

2. What is the upper extreme?

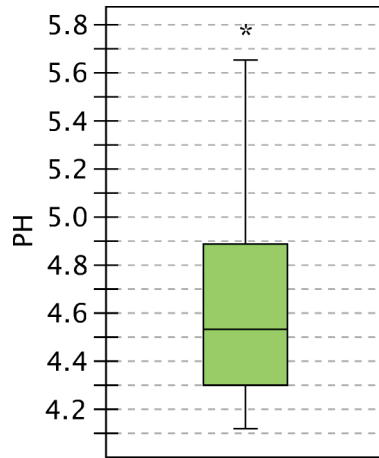   A. 13   B. 19   C. 21.5   D. 28

3. The following dataset shows the sale price (in thousands of dollars) for a sample of 3-bedroom, 2-bathroom homes.

250	254	320	342	221	235	210
426	210	298	231	254	278	234
236	235	300	401	129	234	235
235	245					

   Compute the five-number summary and create a modified box plot. How many outliers are present in this distribution?

   A. 0   B. 1   C. 2   D. 3

4. Researchers measured the pH of water collected from precipitation in an Ohio town. pH is a measure of acidity; a value of 7 is neutral, and values below 7 are acidic. The results are shown in the boxplot below.

   How many outliers are shown on the boxplot?

   A. 1

   B. 2 or more

   C. Cannot be determined, because a boxplot does not say anything about outliers.

   D. Cannot be determined, because some of the values in the upper whisker could be outliers.

5. The speeds of 57 cars were measured (in mph) on a country road. A numerical summary of the results is given below.

N	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max
57	45.53	1.64	12.38	25.60	36.80	43.20	51.20	83.20

   Is the highest recorded speed, 83.2 km/h, an outlier in this data set? Explain why or why not.

6. The calorie contents for hamburgers from 20 different fast food restaurants were measured. Summary statistics for the calorie content are shown below.

N	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max
20	156.85	5.06	22.64	111.00	139.50	152.50	179.75	190.00

Are the highest and lowest values in this data set outliers?

A. The minimum value is an outlier, but the maximum is not.

B. The maximum value is an outlier, but the minimum is not.

C. Neither minimum nor maximum value is an outlier.

D. Both minimum and maximum values are outliers.

Outliers

7. The following stem-and-leaf plot shows the results of a math test given to 30 students.
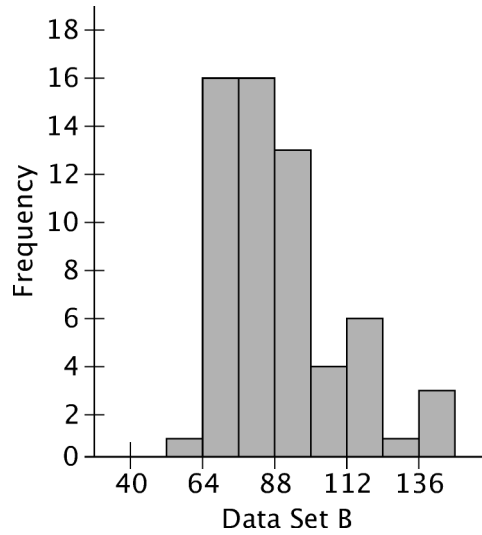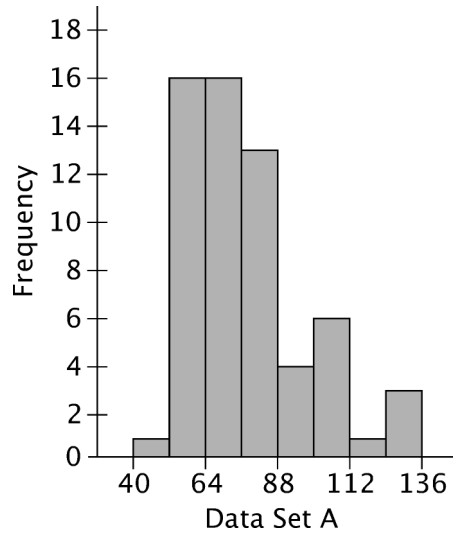
9	0 2 2 6
8	1 1 3 3 4 6 6 7 9
7	3 3 5 7 7 7 8
6	0 4 8 7 9 9
5	0 8 9
4	2

What is the upper extreme?

A. 42   B. 54   C. 69   D. 96

8. The histograms of two data sets are shown below.

Data Set A

Data Set B

Descriptive statistics for Data Set A are given below.

N	Mean	SE Mean	StDev	Q1	Q3
60	78.43	2.57	19.92	62.95	86.58

How many observations in Data Set A are outliers according to the "1.5 times IQR" rule?

A. exactly 1 outlier

B. exactly 2 outliers

C. more than 2 outliers

D. We cannot tell from the information given.

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1.
Answer: A
Points: 1

2.
Answer: D
Points: 1

3.
Answer: D
Points: 1

4.
Answer: A
Points: 1

5.
Answer: IQR is $51.20 - 36.80 = 14.4$; $1.5\times$ IQR is
            21.6; Q3 plus this is $51.2 + 21.6 = 72.8$.
            The maximum value is 83.2, larger than
            this, so is an outlier by this criterion.
Points: 1

6.
Answer: C
Points: 1

7.
Answer: D
Points: 1

8.
Answer: C
Points: 1