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1. A violin student records the number of hours she spends practicing during each of nine consecutive weeks:

   6.2 5.0 4.3 7.4 5.8 7.2 8.4 1.2 6.3

   What is the mean number of hours spent practicing per week during this period?
   A) 6.15 hours
   B) 5.76 hours
   C) 6.20 hours
   D) 8.40 hours

2. A violin student records the number of hours she spends practicing during each of nine consecutive weeks:

   6.2 5.0 4.3 7.4 5.8 7.2 8.4 1.2 6.3

   What is the median number of hours spent practicing per week during this period?
   A) 6.15 hours
   B) 5.76 hours
   C) 6.20 hours
   D) 8.40 hours

3. A violin student records the number of hours she spends practicing during each of nine consecutive weeks:

   6.2 5.0 4.3 7.4 5.8 7.2 8.4 1.2 6.3

   What is the first quartile for these data?
   A) 5.00 hours
   B) 5.76 hours
   C) 7.20 hours
   D) 4.65 hours

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4. A violin student records the number of hours she spends practicing during each of nine consecutive weeks:

   6.2 5.0 4.3 7.4 5.8 7.2 8.4 1.2 6.3

   What is the interquartile range (*IQR*) for these data?
   A) 3.00 hours
   B) 2.65 hours
   C) 3.20 hours
   D) 1.65 hours

5. A violin student records the number of hours she spends practicing during each of nine consecutive weeks:

   6.2 5.0 4.3 7.4 5.8 7.2 8.4 1.2 6.3

   Considering the smallest data value (1.2) and using the 1.5 × *IQR* rule, we would:
   A) classify the value 1.2 as an outlier, because it is more than 1.5 × *IQR* below the first quartile.
   B) not classify the value 1.2 as an outlier, because it is not more than 1.5 × *IQR* below the first quartile.
   C) classify the value 1.2 as an outlier, because it is more than 1.5 × *IQR* below the median.
   D) classify the value 1.2 as an outlier, because it is more than 1.5 × *IQR* below the mean.

6. The 18 faculty members in a college math department range in age from 32 to 68. A stemplot follows:

3	2 4 8 9 9
4	0 3 5 6 9
5	3 4 7 8 9 9
6	3 8

   The median age of the faculty members is:
   A) 39 years.
   B) 45 years.
   C) 47.5 years.
   D) 49 years.

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7. The 18 faculty members in a college math department range in age from 32 to 68. A stemplot follows:

3	2 4 8 9 9
4	0 3 5 6 9
5	3 4 7 8 9 9
6	3 8

If the eldest faculty member retires and is replaced by a 26-year-old, the median age will:
A) decrease by 2 years.
B) stay the same.
C) increase by 2 years.
D) increase by 4 years.

8. The 18 faculty members in a college math department range in age from 32 to 68. A stemplot follows:

3	2 4 8 9 9
4	0 3 5 6 9
5	3 4 7 8 9 9
6	3 8

The first and third quartiles of the ages of the faculty members are:
A) 38 and 57 years.
B) 39 and 57 years.
C) 39 and 58 years.
D) 40 and 58 years.

9. The 18 faculty members in a college math department range in age from 32 to 68. A stemplot follows:

3	2 4 8 9 9
4	0 3 5 6 9
5	3 4 7 8 9 9
6	3 8

The 1.5 × *IQR* rule would identify an age as a low outlier if it was less than:
A) 32 years.
B) 28.5 years.
C) 19 years.
D) 10.5 years.

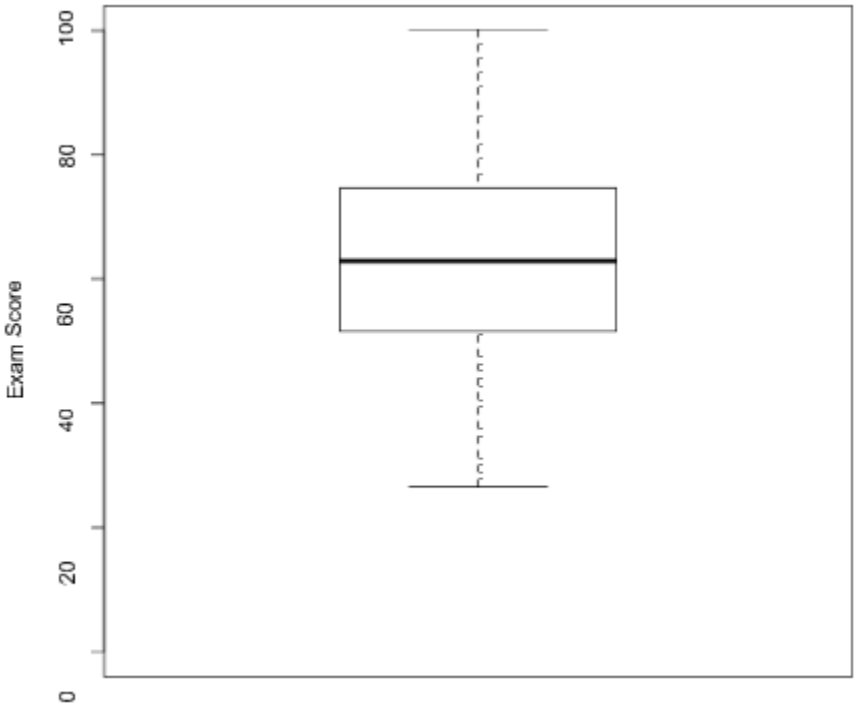
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10. The 18 faculty members in a college math department range in age from 32 to 68. A stemplot follows:

3	2 4 8 9 9
4	0 3 5 6 9
5	3 4 7 8 9 9
6	3 8

The 1.5 × *IQR* rule would identify an age as a high outlier if it exceeded:
A) 19 years.
B) 28.5 years.
C) 77 years.
D) 86.5 years.

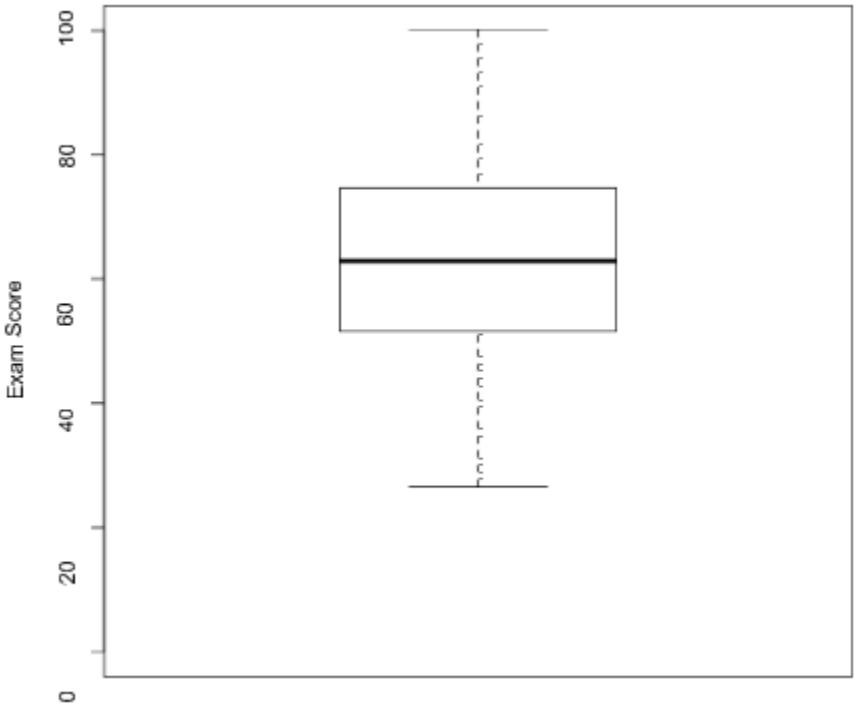
11. The exam scores (out of 100 points) for all students taking an introductory statistics course are used to construct the following boxplot:



Based on this boxplot, the interquartile range is closest to:
A) 10.
B) 25.
C) 50.
D) 80.

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12. The exam scores (out of 100 points) for all students taking an introductory statistics course are used to construct the following boxplot:

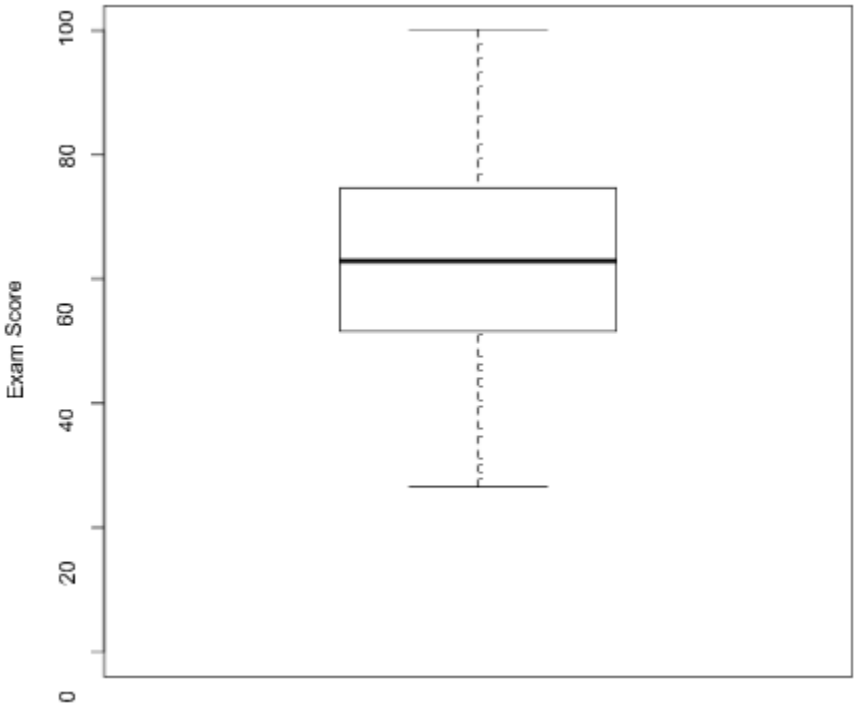


Based on this boxplot, which of the following statements is true?

A) The distribution of scores is fairly symmetric.
B) About half the students scored below 63.
C) Nobody scored below 25.
D) All of the answer options are correct.

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13. The exam scores (out of 100 points) for all students taking an introductory statistics course are used to construct the following boxplot:

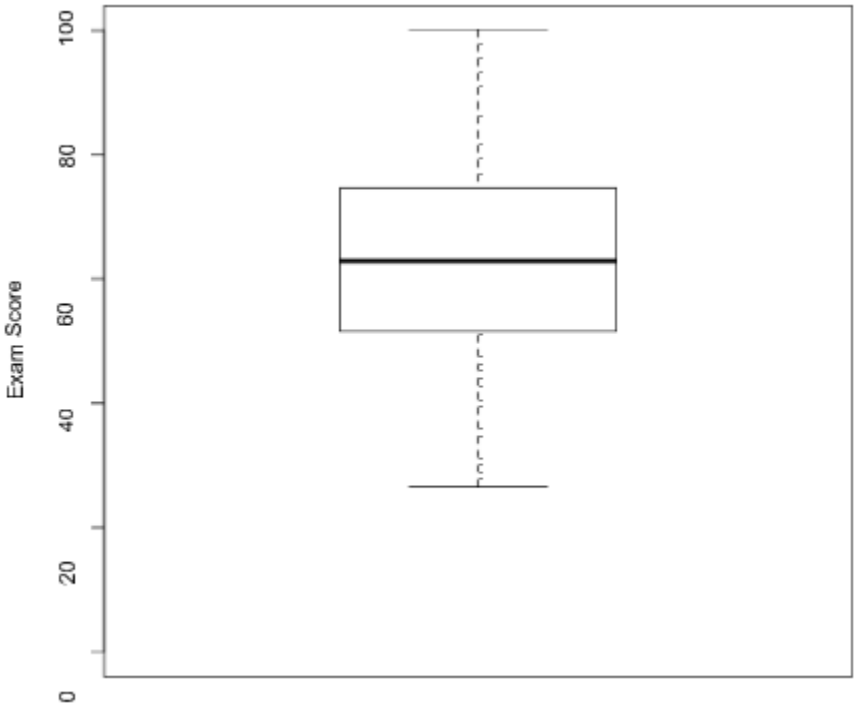


If each person increased his or her score by 5 points, then:

A) the third quartile would increase by 5 points.
B) the median score would increase by 5 points.
C) the interquartile range would remain unchanged.
D) All of the answer options are correct.

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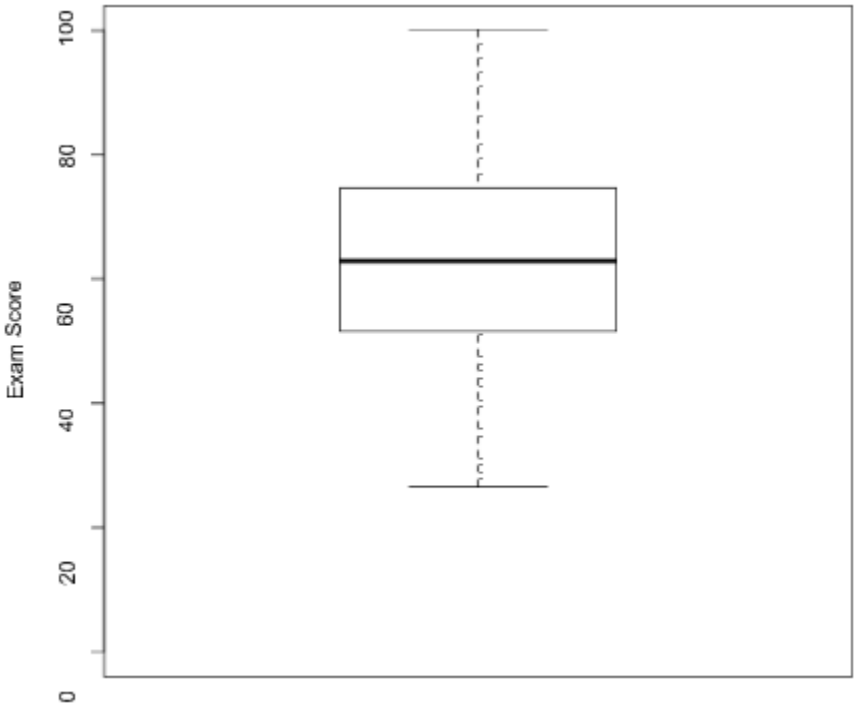
14. The exam scores (out of 100 points) for all students taking an introductory statistics course are used to construct the following boxplot:



About 25% of the students' scores exceeded:
A) 50.
B) 60.
C) 75.
D) 85.

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15. The exam scores (out of 100 points) for all students taking an introductory statistics course are used to construct the following boxplot:

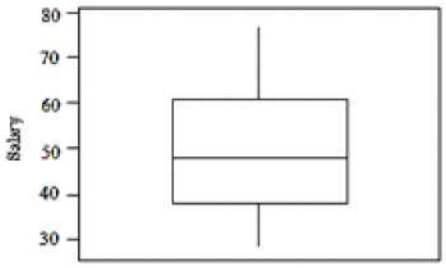


If 5 points were added to each score, then standard deviation of the new scores would:

A) be increased by 5.
B) be increased by 25.
C) be decreased by 5.
D) remain unchanged.

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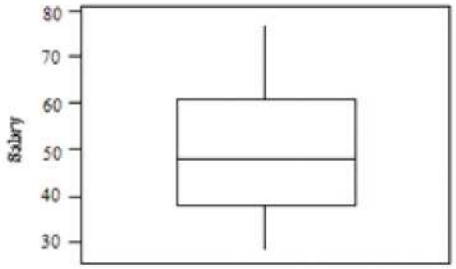
16. A sample was taken of the salaries of 20 employees of a large company. The following is a boxplot of the salaries (in thousands of dollars) for this year.



Based on this boxplot, which of the following statements is true?

A) The interquartile range is about $20,000.
B) The minimum salary is $20,000.
C) The range of the salaries is about $75,000.
D) The median salary is about $40,000.

17. A sample was taken of the salaries of 20 employees of a large company. The following is a boxplot of the salaries (in thousands of dollars) for this year.

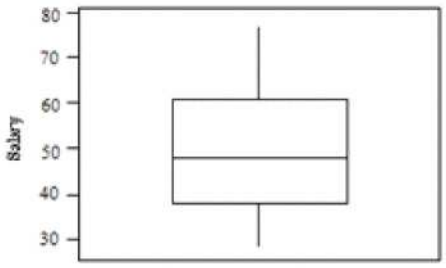


Based on this boxplot, the five-number summary (in thousands of dollars) is:

A) 28, 39, 48, 60.5, 77.
B) 28, 41, 48, 58, 77.
C) 28, 39, 51, 58, 77.
D) 28, 41, 51, 60.5, 77.

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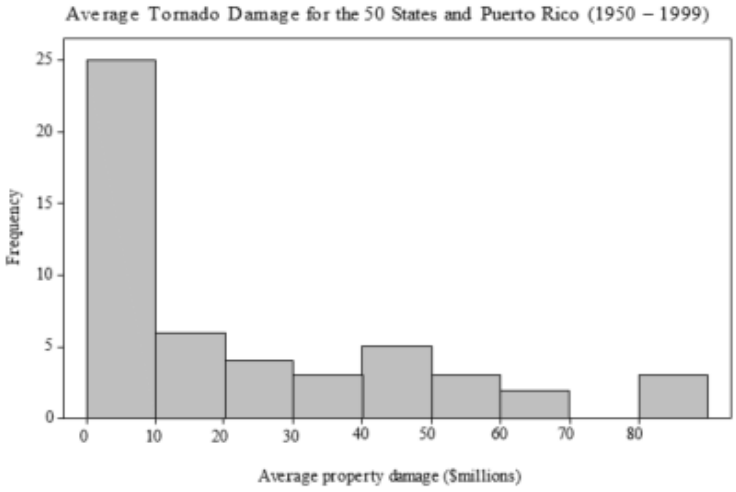
18. A sample was taken of the salaries of 20 employees of a large company. The following is a boxplot of the salaries (in thousands of dollars) for this year.



Based on this boxplot, which of the following statements is true?

A) The outliers are 28 and 77.
B) Suspected outliers would be less than 28 or greater than 77, so there are none.
C) Suspected outliers would be less than 6.75 or greater than 92.75, so there are none.
D) There are outliers, but they are not shown in the boxplot.

19. For each of the states and Puerto Rico, the histogram below shows the average property damage (in millions of dollars) caused by tornadoes over a 50-year period.

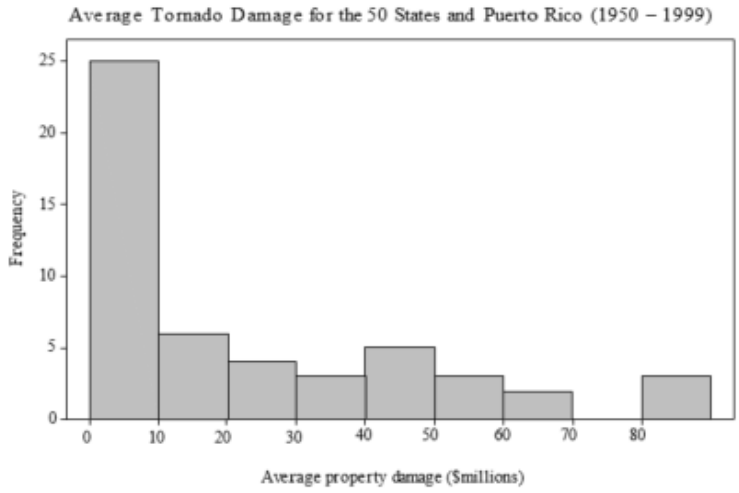


From the histogram, the first quartile must be:

A) in the interval 0–10.
B) in the interval 10–20.
C) in the interval 30–40.
D) greater than 10.

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20. For each of the states and Puerto Rico, the histogram below shows the average property damage (in millions of dollars) caused by tornadoes over a 50-year period.



From the histogram, the median must be approximately:
A) 15.
B) 25.
C) 30.
D) 40.

21. The percent of observations above the third quartile in a distribution is:
A) 25%.
B) 50%.
C) 75%.
D) None of the answer options is correct.

22. The average salary of all female workers at a large plant is $35,000. The average salary of all male workers at the plant is $41,000. If there are more female workers than male workers at the plant, then the average salary at the plant must be:
A) exactly $38,000.
B) larger than $38,000.
C) smaller than $38,000.
D) larger than $41,000.

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23. Which of the following is likely to have a mean that is smaller than the median?
    A) the salaries of all National Football League players, where a few players make much more than most players
    B) the scores of students (out of 100 points) on a very easy exam, in which most scores are high but a few scores are low
    C) the prices of homes in a large city, where there are lots of relatively inexpensive homes and a few very expensive homes
    D) the scores of students (out of 100 points) on a very difficult exam, in which most scores are low but a few scores are high

24. Which of the following sets of four numbers has the smallest standard deviation?
    A) 7, 8, 9, 10
    B) 5, 5, 5, 6
    C) 0, 0, 10, 10
    D) 0, 1, 2, 3

25. A group of four friends has a median age of 22. Three of the friends are ages 20, 18, and 24. The age of the fourth friend must be:
    A) 22.
    B) 24 or older.
    C) 18 or younger.
    D) None of these choices are correct; we can't tell from the information provided.

26. Student ages (to the nearest year) in a school are as follows:

Age	18	19	20	21	22	23	24	25	32
Number of students	14	120	200	200	90	30	10	2	1

    What is true about the median age?
    A) It is 20.
    B) It would remain unchanged if the 32-year-old was replaced with an 80-year-old.
    C) It is between the first and third quartiles.
    D) All of the answer options are correct.

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27. Student ages (to the nearest year) in a school are as follows:

Age	18	19	20	21	22	23	24	25	32
Number of students	14	120	200	200	90	30	10	2	1

What is true about the mean age?
A) It is less than 20.
B) It is greater than 20.
C) It is exactly 20.
D) It would remain unchanged if the 32-year-old was replaced with an 80-year-old.

28. The following is a sample of the percent increase in five growth funds over a one-year period.

8.9% 12.2% 13.7% 14.4% 9.8%

The mean percent increase in this sample is:
A) 11.8%.
B) 12.2%.
C) 13.7%.
D) 14.1%.

29. There are three children in a room, ages 3, 4, and 5. If another 4-year-old enters the room:
A) the mean age will stay the same, but the variance will increase.
B) the mean age will stay the same, but the variance will decrease.
C) the mean age and variance will stay the same.
D) the mean age and variance will increase.

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30. In a class of 100 students, the grades on an accounting test are summarized in the following frequency table:

Grade	Frequency
91–100	11
81–90	31
71–80	42
61–70	16

The median grade is in which of the following intervals?
A) 61–70
B) 71–80
C) 81–90
D) 91–100

31. In a class of 100 students, the grades on an accounting test are summarized in the following frequency table:

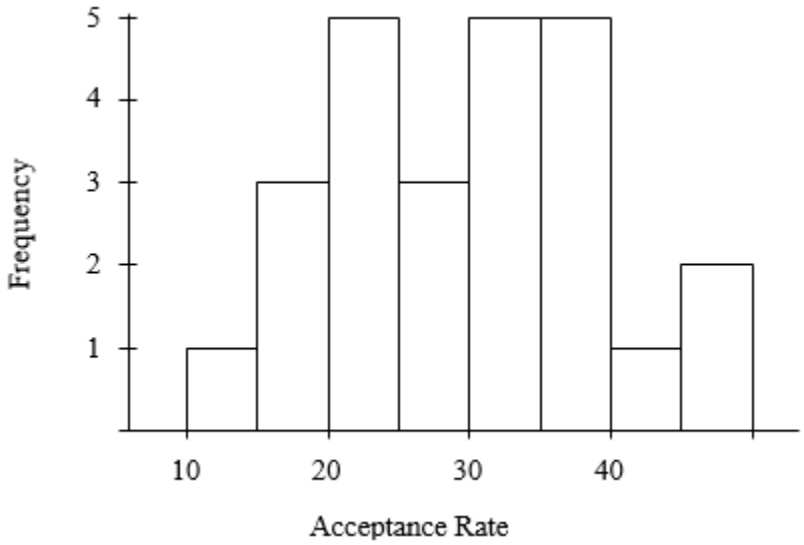
Grade	Frequency
91–100	11
81–90	31
71–80	42
61–70	16

The distribution of grades is:
A) symmetric.
B) skewed left.
C) skewed right.
D) not able to be determined from the information given.

32. The median age of five people in a meeting is 30 years. One of the people, whose age is 50 years, leaves the room. The median age of the remaining four people in the room is:
A) 40 years.
B) 30 years.
C) 25 years.
D) not able to be determined from the information given.

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33. The following histogram represents the distribution of acceptance rates (percent accepted) among 25 business schools in 2004. In each class interval, the left endpoint but not the right is included, so the class intervals are $10 \le \text{rate} < 15$, $15 \le \text{rate} < 20$, etc.

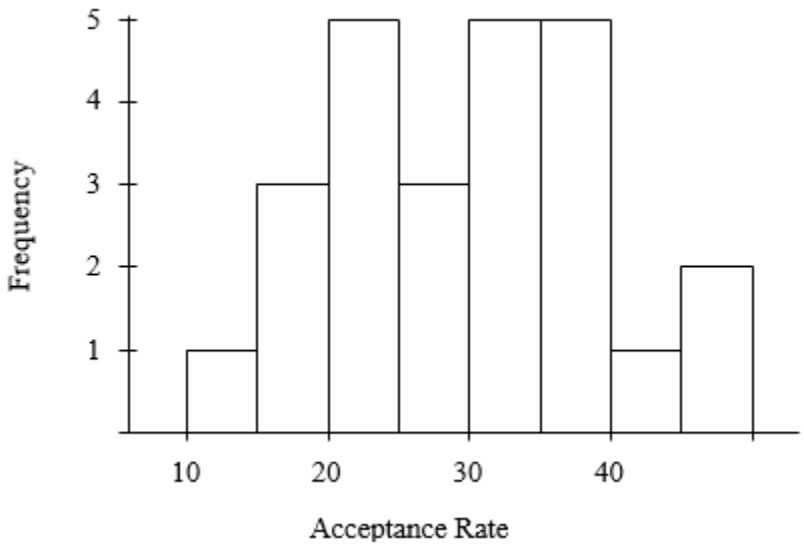


What is the median acceptance rate?

A) 20%
B) just below 30%
C) just above 30%
D) 40%

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34. The following histogram represents the distribution of acceptance rates (percent accepted) among 25 business schools in 2004. In each class interval, the left endpoint but not the right is included, so the class intervals are $10 \le \text{rate} < 15$, $15 \le \text{rate} < 20$, etc.



Which of the following could be the five-number summary for these data?
A) 10, 22, 31, 39, 50
B) 10, 20, 30, 40, 50
C) 10, 26, 31, 34, 50
D) 10, 22, 31, 29, 39

35. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate the factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained seven stallions; their ages (in years) are as follows:

10 20 4 13 21 16 16

The mean age for this group of stallions is:
A) 16.
B) 13.
C) 14.3.
D) 12.5.

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36. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained seven stallions; their ages (in years) are as follows:

    10 20 4 13 21 16 16

    The median age of the stallions is:
    A) 16.
    B) 12.5.
    C) 14.
    D) None of the answer options is correct.

37. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained seven stallions; their ages (in years) are as follows:

    10 20 4 13 21 16 16

    The *IQR* of age for the stallions is:
    A) 17.
    B) 21.
    C) 16.
    D) 10.

38. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained seven stallions; their ages (in years) are as follows:

    10 20 4 13 21 16 16

    The youngest stallion, at 4 years old, is:
    A) an outlier, because it is more than 15 years below the lower quartile.
    B) an outlier, because it is the minimum.
    C) not an outlier, because it is less than 15 years below the lower quartile.
    D) not an outlier, because it is a positive value.

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39. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained seven stallions; their ages (in years) are as follows:

10 20 4 13 21 16 16

The standard deviation of the ages for the stallions is:
A) 34.9.
B) 5.91.
C) 10.
D) 17.

40. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate the factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained 60 mares, and the frequency table below displays their ages.

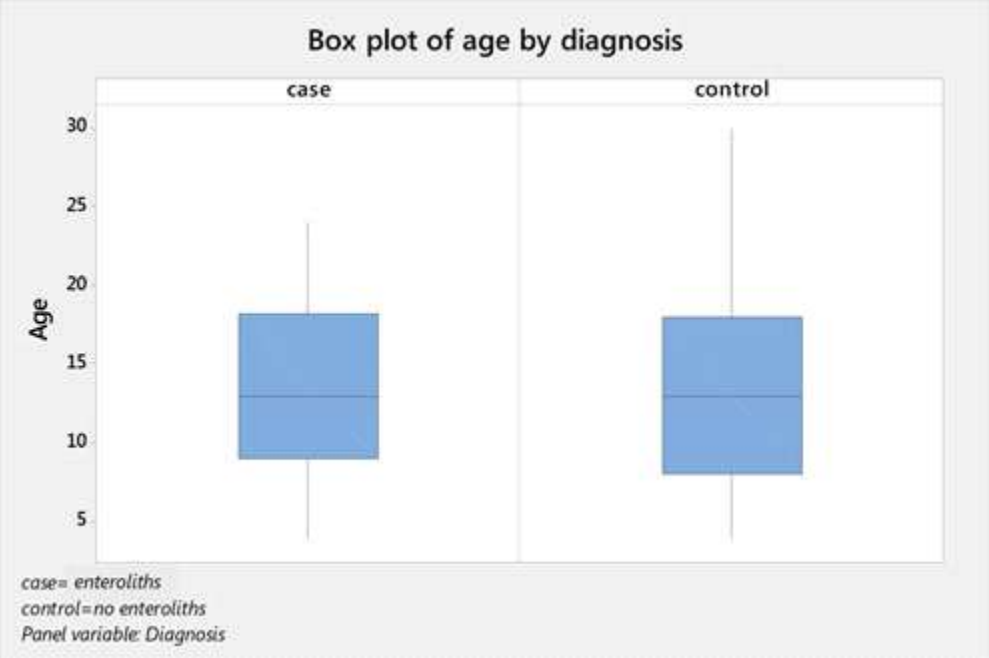
Age	4	5	6	7	8	10	11	12	13	14
Freq	2	2	5	5	5	4	3	5	3	5

Age	15	18	19	20	22	23	24	28
Freq	3	3	3	5	1	3	2	1

The mean age of the mares is:
A) 12.
B) 16.
C) 13.13.
D) 14.35.

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41. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate the factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained 62 horses with enteroliths (cases) and 75 horses without (controls). The graph below contains side-by-side boxplots of the ages for cases and controls.

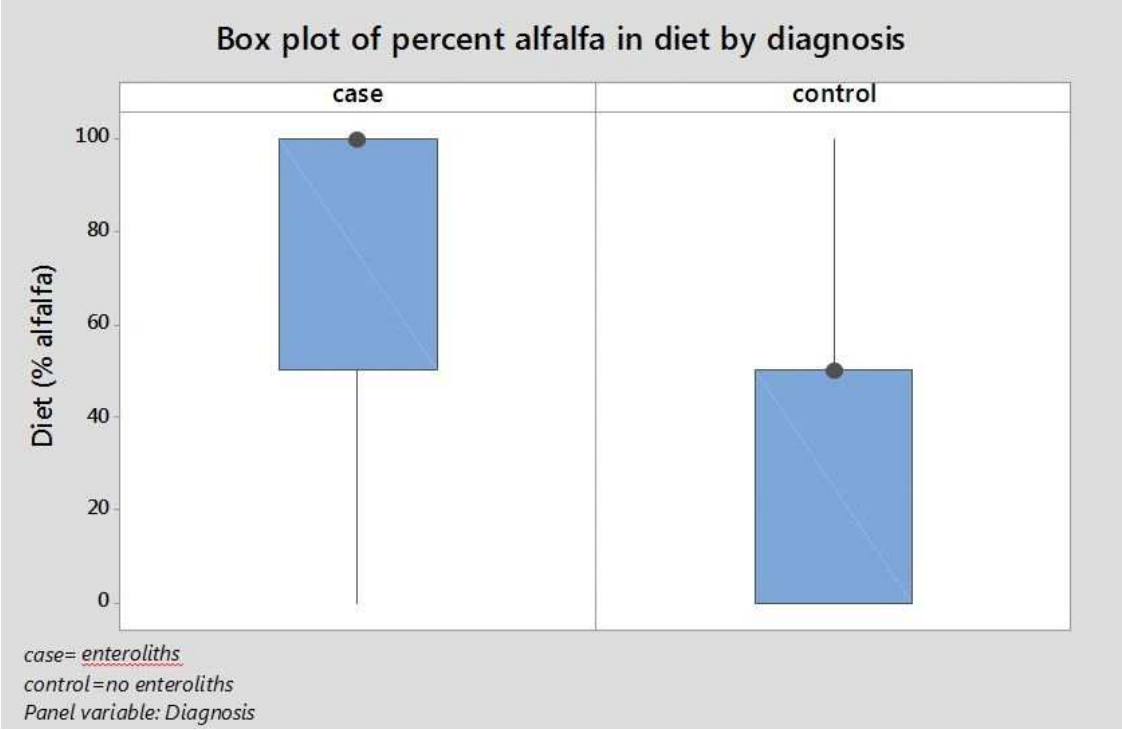


Based on the boxplots, the mean age for the cases:

A) is lower than the mean age for the controls.
B) is approximately the same as the mean age for the controls.
C) is higher than the mean age for the controls.
D) cannot be determined from boxplots.

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42. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained 62 horses with enteroliths (cases) and 75 horses without (controls). The graph below contains side-by-side boxplots of the percent of alfalfa in the diet for cases and controls.

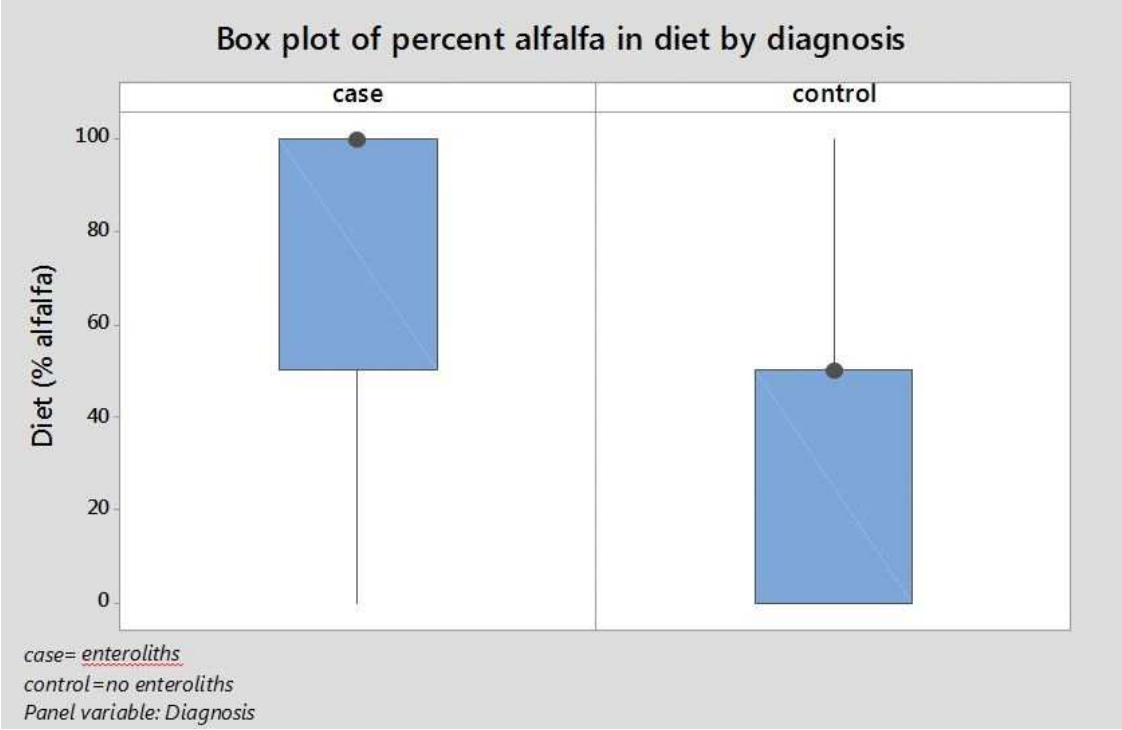


Based on the boxplot for cases, the distribution of the amount of alfalfa in the diet is:

A) highly skewed left.
B) highly skewed right.
C) symmetric.
D) None of the answer options is correct.

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43. Enteroliths are calcifications that form in the gut of a horse. The stones can cause considerable morbidity and mortality. A study was conducted to investigate factors (such as diet and environment) that may be related to the formation of enteroliths. The study contained 62 horses with enteroliths (cases) and 75 horses without (controls). The graph below contains side-by-side boxplots of the percent of alfalfa in the diet for cases and controls.



Based on the boxplot cases, the median amount of alfalfa in the diet of cases is:

A) the same as for controls.
B) half the amount as for controls.
C) twice the amount as for controls.
D) None of the answer options is correct.

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44. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The mean for these data is:
A) 84.3.
B) 88.6.
C) 92.4.
D) 88.0.

45. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The median for these data is:
A) 63.
B) 88.
C) 92.
D) 105.

46. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The first quartile for these data is:
A) 63.
B) 88.
C) 92.
D) 105.

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47. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The interquartile range for these data is:
A) 45.
B) 63.
C) 42.
D) 105.

48. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The standard deviation for these data is:
A) 29.9.
B) 893.41.
C) 28.4.
D) 804.29.

49. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

The five-number summary for these data is:
A) 63, 88.6, 105, 42, 145.
B) 45, 88, 88.6, 105, 145.
C) 45, 63, 92, 105, 145.
D) 45, 63, 88, 105, 145.

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50. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

A student who was not included in the survey recorded a time of 240 minutes on social media. That value is:
A) consistent with these data.
B) inconsistent with these data.
C) an outlier.
D) clearly an erroneous recording.

51. A survey of 10 students was conducted to investigate the amount of time they spend on social media each day. Students were given a timer and asked to record the number of minutes spent every time they accessed social media. The students' total times for one day are given below (in minutes).

45 57 63 79 84 92 99 105 117 145

A high outlier is any value above:
A) 105.
B) 168.
C) 117.
D) 200.

52. The table below gives exam scores for 30 students.

Age	45	63	68	72	78	84	87	91	94	97
Freq	1	2	2	4	3	5	3	3	3	2

The mean for these data (rounded to the nearest integer) is:
A) 85.
B) 84.
C) 87.
D) 82.

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53. A teacher returns an exam with possible scores ranging from 0 to 100. The students suspect that the majority of them performed poorly on the exam and request summary statistics. The teacher provides the mean, which was 72, as a summary statistic. A total of 400 students took the exam. Some of the students find the mean to be high, based on talking to other students. They take a random sample of 15 students, and they find that the mean equals 71.5 while the median equals 62. Based on this result, we conclude that:
    A) there are possibly some large outliers in these data.
    B) exam scores are likely right-skewed.
    C) 50% of the students barely managed to pass the exam.
    D) All of the answer options are correct.

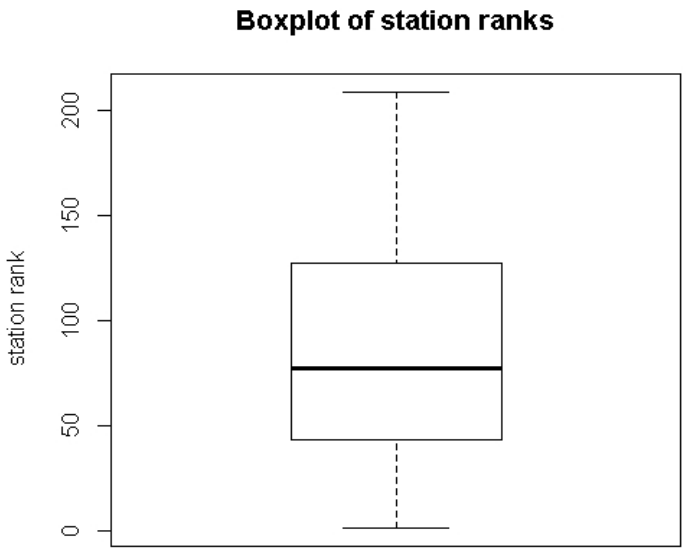
54. A teacher returns an exam with possible scores ranging from 0 to 100. The students suspect that the majority of them performed poorly on the exam and request summary statistics. The teacher provides the mean, which was 72, as a summary statistic. A total of 400 students took the exam. Some of the students find the mean to be high, based on talking to other students. They take a random sample of 15 students, and they find that the mean equals 71.5 while the median equals 62. Based on this result, we conclude that:
    A) the boxplot is most likely symmetric about the mean.
    B) the mean will be in the center of the boxplot.
    C) the mean will be off center in the boxplot and above the median.
    D) None of the answer options is correct.

55. A teacher returns an exam with possible scores ranging from 0 to 100. The students suspect that the majority of them performed poorly on the exam and request summary statistics. The teacher provides the mean, which was 72, as a summary statistic. A total of 400 students took the exam. The teacher, after several requests, provides a boxplot of the exam scores. The students can get which of the following pieces of information from this plot?
    A) the median
    B) the *IQR*
    C) the minimum and the maximum
    D) All of the answer options are correct.

56. A modified boxplot for a right-skewed data set uses a special character to point to:
    A) the median.
    B) the maximum.
    C) the third quartile.
    D) an outlier.

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57. A survey of radio stations was conducted following the attacks on the World Trade Center in 2001. One of the variables recorded was the region in which the station was located (east, center, or west). In addition to the variable "region," the following information was collected: the quartile of the media market (top, second, third, and fourth), state, rank (a number between 1 and 205), and share (a number between 0 and 7).

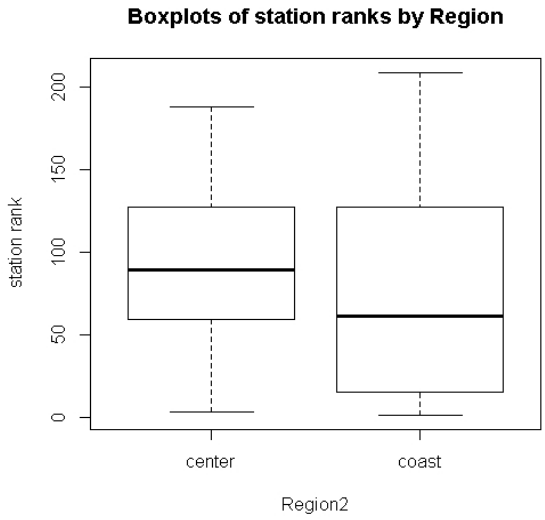


The modified boxplot of station ranks above identifies how many outliers?

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

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58. A survey of radio stations was conducted following the attacks on the World Trade Center in 2001. One of the variables recorded was the region in which the station was located (east, center, or west). In addition to the variable "region," the following information was collected: the quartile of the media market (top, second, third, and fourth), state, rank (a number between 1 and 205), and share (a number between 0 and 7).



The side-by-side boxplots of station rank, above, show:

A) different median ranks between the regions.
B) more variability in ranks of coast stations.
C) similar minimum ranks between regions.
D) All of the answer options are correct.

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Answer Key

1. B
2. C
3. D
4. B
5. B
6. C
7. A
8. C
9. D
10. D
11. B
12. D
13. D
14. C
15. D
16. A
17. A
18. C
19. A
20. A
21. A
22. C
23. B
24. B
25. B
26. D
27. B
28. A
29. B
30. B
31. C
32. D
33. C
34. D
35. C
36. A
37. D
38. C
39. B
40. C
41. A
42. A
43. C
44. B

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45. B
46. A
47. C
48. A
49. D
50. C
51. B
52. D
53. D
54. C
55. D
56. D
57. A
58. D

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