Concept #5: Statistics

What you need to know

Mean:

Median:

Mode:

Range:

Outliers affect the (circle one): **Mean / Median**

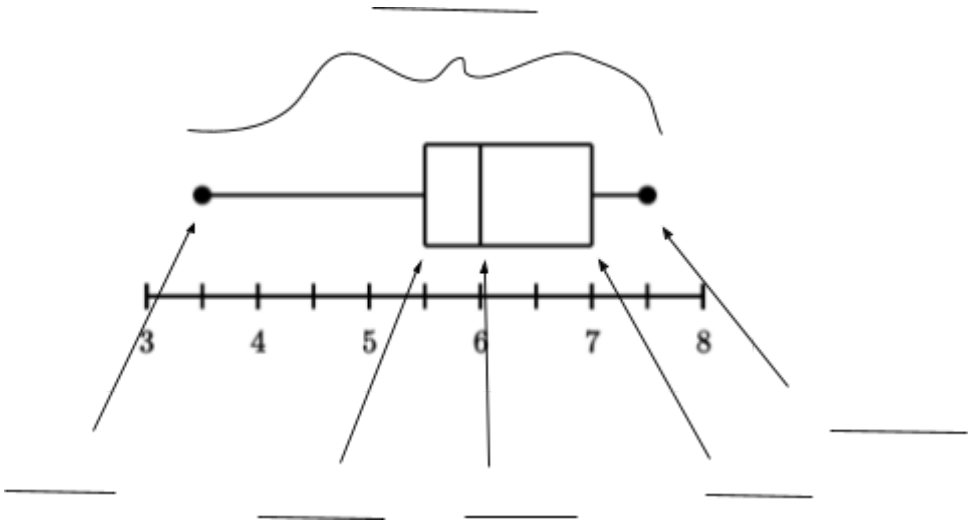
To calculate the median, first put the data in (circle one): **Ascending / Descending** order.

The greater the standard deviation, the more (circle one) **Spread Out / Concentrated** the data is.

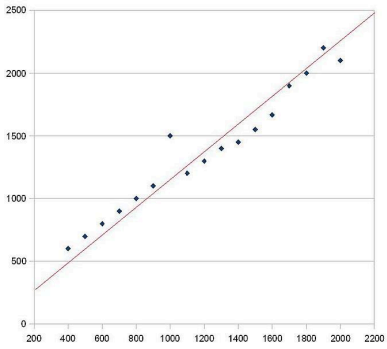
Bell curve that has a higher Standard Deviation:

Bell curve that has a lower Standard Deviation:

Parts of a box plot:



Scatterplots



In a scatter plot, the **line of best fit** represents the (circle one): **ACTUAL / ESTIMATES**

In a scatter plot, the **dots** represent the (circle one): **ACTUAL / ESTIMATES**

If dot plots/bar graphs are **symmetrical** about the same value, they have the same **mean.**

⭐MEAN, MEDIAN, MODE AND RANGE⭐

6

73, 74, 75, 77, 79, 82, 84, 85, 91

What is the median of the data shown?

10.

Ages of 20 Students Enrolled in a College Class

Age	Frequency
18	6
19	5
20	4
21	2
22	1
23	1
30	1

The table above shows the distribution of ages of the 20 students enrolled in a college class. Which of the following gives the correct order of the mean, median, and mode of the ages?

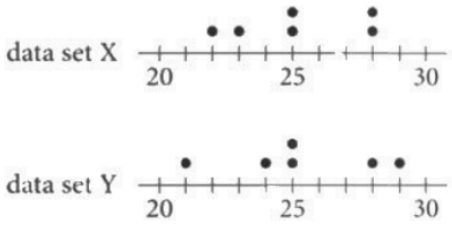
A. mode < median < mean

B. mode < mean < median

C. median < mode < mean

D. mean < mode < median

14



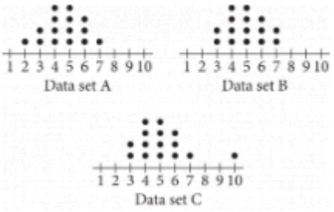
Data set X and data set Y are displayed by the two dot plots shown. Which of the following is(are) the same for both data sets?

1.The mean
2.The median

A) I only
B) II only
C) I and II
D) Neither I nor II

Each of the three data sets represented by the three dot plots has 15 values.

26



The medians of data sets A, B, and C are a, b, and c, respectively. What is the relationship between a, b, and c ?

View Answer

A. $a > b > c$

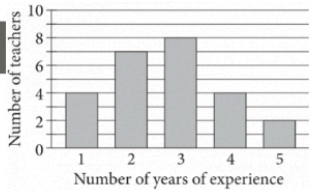
B. $b > a > c$

C. $c > b > a$

D. $a = b = c$

Question Difficulty: Medium

17



The graph above shows the distribution of the number of years of experience for 25 teachers enrolled in an advanced-degree program at a particular university. If a 26th teacher with 2 years of experience is added to the program and to the data set, what will be the effect on the mean and median of the data set?

View Answer

A. The mean and median will both decrease.

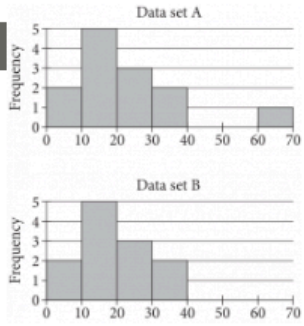
B. The mean and median will both remain the same.

C. The mean will decrease and the median will remain the same.

D. The mean will remain the same and the median will decrease.

⭐OUTLIERS⭐

10



The two histograms show the distribution of data set A and data set B, respectively. Data set B is the result of removing the outlier from data set A. Which of the following statements about the means of data set A and data set B is true?

View Answer

A. The means of data sets A and B are the same.

B. The mean of data set A is greater than the mean of data set B.

C. The mean of data set A is less than the mean of data set B.

D. No comparison about the means of the data sets can be made.

Question Difficulty: Medium

24

Number of pages	Frequency
46	1
47	2
48	4
49	5
50	5
51	2
52	5
53	4

Paulina has 28 books in her collection. The frequency table summarizes the number of pages in each book. If she buys a new book that has 62 pages, how will this impact the mean and median numbers of pages of the books in her collection?

View Answer

A. The mean and median will both increase.

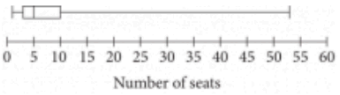
B. The mean and median will both decrease.

C. The mean will increase, and the median will remain the same.

D. The mean will decrease, and the median will remain the same.

⭐BOX PLOTS⭐

2



The box plot summarizes the number of seats in the US House of Representatives currently allocated to each of the 50 states. What is the median number of allocated seats in the US House of Representatives?

View Answer

A. 2

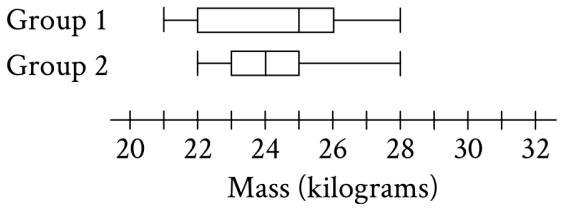
B. 5

C. 10

D. 53

Question Difficulty: Easy

15.



The box plots summarize the masses, in kilograms, of two groups of gazelles. Based on the box plots, which of the following statements must be true?

A. The mean mass of group 1 is greater than the mean mass of group 2.

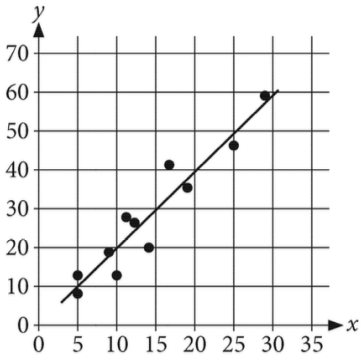
B. The mean mass of group 1 is less than the mean mass of group 2.

C. The median mass of group 1 is greater than the median mass of group 2.

D. The median mass of group 1 is less than the median mass of group 2.

⭐SCATTERPLOTS⭐

20

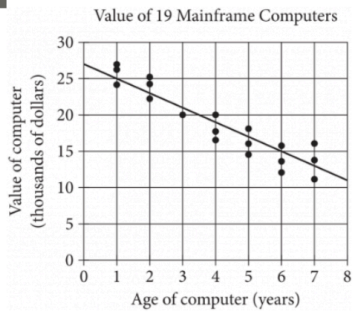


The scatterplot shows a data set of 11 points and a line of best fit for the data. For how many data points is the y-value predicted by the line of best fit greater than the actual y-value?

A) Five
B) Six
C) Seven
D) Eight

Questions 37 and 38 refer to the following information.

37



A large company has 19 mainframe computers of a certain class. The scatterplot above shows the value and age for each of the 19 computers. A line of best fit for the data is also shown.

Based on the line of best fit, the estimated value of a 6-year-old computer is k thousand dollars, where k is an integer. What is the value of k ?

38.

What is the number of computers for which the line of best fit predicts a value less than the actual value?

View Answer

Question Difficulty: Hard

⭐STANDARD DEVIATION⭐

23

The tables below give the distribution of high temperatures in degrees Fahrenheit (°F) for City A and City B over the same 21 days in March.

City A

Temperature (°F)	Frequency
80	3
79	14
78	2
77	1
76	1

City B

Temperature (°F)	Frequency
80	6
79	3
78	2
77	4
76	6

Which of the following is true about the data shown for these 21 days?

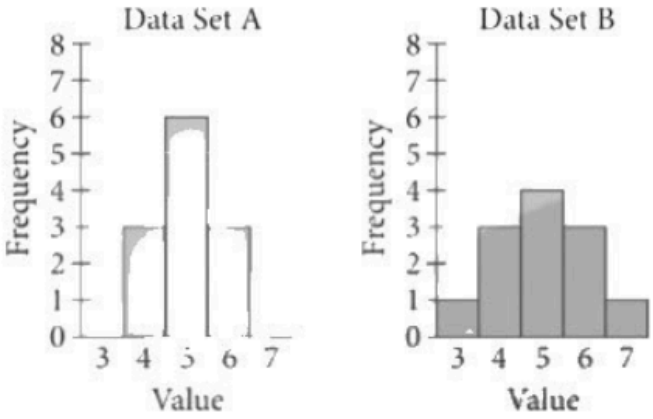
A) The standard deviation of temperatures in City A is larger.

B) The standard deviation of temperatures in City B is larger.

C) The standard deviation of temperatures in City A is the same as that of City B.

D) The standard deviation of temperatures in these cities cannot be calculated with the data provided.

26



Data sets A and B are summarized in the graphs above. Each data set consists of 12 whole numbers. Which of the following statements must be true?

A) Data sets A and B have the same mean, but the standard deviation of data set A is greater than the standard deviation of data set B.

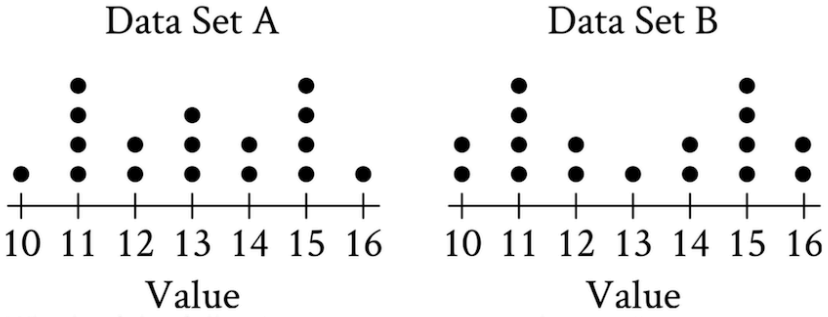
B) Data sets A and B have the same mean, but the standard deviation of data set B is greater than the standard deviation of data set A.

C) Data sets A and B have the same standard deviation, but the mean of data set A is greater than the mean of data set B.

D) Data sets A and B have the same standard deviation, but the mean of data set B is greater than the mean of data set A.

17.

The dot plots represent the distributions of values in data sets A and B.



Which of the following statements must be true?

I. The median of data set A is equal to the median of data set B.

II. The standard deviation of data set A is equal to the standard deviation of data set B.

A. I only

B. II only

C. I and II

D. Neither I nor II

18.

A data set of 27 different numbers has a mean of 33 and a median of 33. A new data set is created by adding 7 to each number in the original data set that is greater than the median and subtracting 7 from each number in the original data set that is less than the median. Which of the following measures does NOT have the same value in both the original and new data sets?

A. Median

B. Mean

C. Sum of the numbers

D. Standard deviation

⭐EVALUATING STATISTICAL CLAIMS⭐

19.

A sample of 40 fourth-grade students was selected at random from a certain school. The 40 students completed a survey about the morning announcements, and 32 thought the announcements were helpful. Which of the following is the largest population to which the results of the survey can be applied?

A. The 40 students who were surveyed

B. All fourth-grade students at the school

C. All students at the school

D. All fourth-grade students in the county in which the school is located

20.

A trivia tournament organizer wanted to study the relationship between the number of points a team scores in a trivia round and the number of hours that a team practices each week. For the study, the organizer selected 55 teams at random from all trivia teams in a certain tournament. The table displays the information for the 40 teams in the sample that practiced for at least 3 hours per week.

Hours practiced	Number of points per round		
	6 to 13 points	14 or more points	Total
3 to 5 hours	6	4	10
More than 5 hours	4	26	30
Total	10	30	40

Which of the following is the largest population to which the results of the study can be generalized?

A. All trivia teams in the tournament that scored 14 or more points in the round

B. The 55 trivia teams in the sample

C. The 40 trivia teams in the sample that practiced for at least 3 hours per week

D. All trivia teams in the tournament

⭐CHALLENGE PROBLEM⭐

Data set A consists of 10 positive integers less than 60. The list shown gives 9 of the integers from data set A.

$$43, 45, 44, 43, 38, 39, 40, 46, 40$$

The mean of these 9 integers is 42. If the mean of data set A is an integer that is greater than 42, what is the value of the largest integer from data set A?

Concept #5 Statistics Answers

6. 79
10. A
34. 863
14. B
26. D
17. C
10. B
24. C
2. B
15. C
20. A
37. 15
38. 9
23. B
26. B
17. A
18. D
19. B
20. D

CHALLENGE PROBLEM

Answer: 52