

35 38 30 25 33 34 30 40 41 42 41 39 36 40

Solution

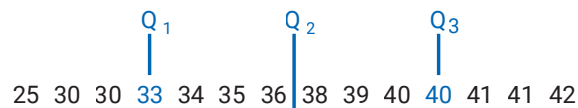
The data set is not in ranked order. To find the quartiles, the data must be rearranged into ascending order.

25 30 30 33 34 35 36 38 39 40 40 41 41 42

There are 14 data values, so the second quartile, or median, is the mean of the seventh and eighth values (36 and 38) in the ranked data set. The second quartile of the data set is 37.

To find the first quartile, we need to find the middle of the first half of the data, in other words the median of that set. There are 7 values in the first half of the data so the fourth value is the median. Thus, the first quartile is 33.

To find the third quartile, we need to find the middle of the second half of the data, in other words the median of that set. There are 7 values in the second half of the data so the fourth value is the median. Therefore, the third quartile is 40.



First Quartile = 33

Second Quartile (Median) = 37

Third Quartile = 40

Now work margin exercise 5.

Margin Exercise Answers

1. 26 2. 9 3. Approximately 7.76 points 4. Alejandro's score is not good enough to get into his top college choice. 5. First Quartile = 60; Second Quartile (Median) = 71; Third Quartile = 74

10.4 Exercises

Concept Check

Fill-in-the-blank. Complete the sentences using information found in this section.

- The _____ is the difference between the largest value and smallest value in a data set.
- A _____ describes the "spread" of a data set.
- The _____ indicates how much we would expect a data value to differ from the mean.

4. _____ divide the data set up into 100 equal parts and indicates approximately what percentage of the data lies at or below the data value
5. A measure of _____ describes the position of a specific data value in a data set compared to the rest of the values in the set.
6. When percentiles divide a data set into four equal parts the parts are called _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. The standard deviation takes only two data values into consideration.
8. The median is the second quartile.
9. Quartiles divide a data set into eight equal parts.
10. The larger the standard deviation the more the data values are spread out

Practice

Find the range and standard deviation for each of the following data sets. Round the standard deviation to the nearest hundredth. See Examples 1 through 3.

1. 14, 18, 16, 15, 18, 19, 12, 14, 16, 19
2. 42, 45, 44, 43, 46, 48, 47, 48, 49, 42, 43, 44, 46, 48
3. \$20, \$22, \$24, \$29, \$26, \$25, \$23, \$26, \$25, \$29, \$32, \$28
4. 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7
5. 21, 23, 22, 23, 26, 24, 20, 25
6. 6, 8, 9, 8, 5, 7, 10, 5, 8, 7
7. Use the following statistics regarding yearly salaries at a local corporation.
 Q_1 : \$64,000 Q_2 : \$78,000 Q_3 : \$82,000 80th Percentile: \$84,500
 - a. What salary did half the employees exceed?
 - b. About what percentage of employees' salaries exceeded \$82,000?
 - c. About what percentage of the employees earned \$64,000 or less?
 - d. About what percentage of the employees earned more than \$84,500?
8. Use the following statistics regarding monthly salaries at a local insurance company.
 First Quartile: \$38,000 Second Quartile: \$51,000
 Third Quartile: \$76,000 84th Percentile: \$87,500
 - a. What salary did half the employees exceed?

- b. About what percent of the employees' salaries exceeded \$38,000?
 - c. About what percent of the employees' salaries was less than \$76,000?
 - d. About what percent of the employees' salaries was more than \$87,500?
9. Use the following statistics regarding the hourly wage for staff at a local company.

First Quartile: \$8.00/hour Second Quartile: \$16.00/hour

Third Quartile: \$22.00/hour 68th Percentile: \$19.00/hour

- a. What hourly wage did half the employees exceed?
 - b. About what percent of the employees' hourly wage exceeded \$19.00/hour?
 - c. About what percent of the employees' hourly wage was less than \$16.00/hour?
 - d. About what percent of the employees' hourly wage was less than \$22.00/hour?
10. A random sample of the weights of passengers' carry-on luggage was collected. The weights (in pounds) of the luggage pieces were as follows.

36 44 40 31 33 40 37 40 38 41

11. A random sample of the heights of basketball players at a local tournament was collected. The heights (in inches) of the players were as follows.

62 78 72 71 74 69 73 74 75 77

12. The number of pacifiers lost each day by babies at the local daycare is as follows.

3 2 0 2 0 2 0 3 4 2 1 2

13. A sample of bowling scores by bowlers in a local recreational league are as follows.

164 185 152 160 163 165 195 185 182 167

14. Golf scores by golfers in a local recreational league are as follows.

82 78 84 98 72 91 77 78 86 90

15. The number of rebounds gathered by players in a recent basketball game are as follows.

4 8 6 7 5 4 8 9 12 6

Find the quartiles for each of the following scenarios. See Example 5

16. A sample of golf scores by golfers in a local tournament are as follows.

82 78 68 69 74 71 73 72 80 81

17. A sample of assists by point guards in a local basketball tournament are as follows.

8 2 3 4 6 2 5 8 12 5 4 7 9

18. A sample of the number of text messages sent each day by teenagers is as follows.

12 15 11 10 6 20 25 18 22 16 15 20 21 23

19. The number of emails sent per day are as follows.

34 36 22 38 40 28 20 21 32 30 12 41

20. The number of text messages sent per day are as follows.

8 15 4 20 45 3 10 22 30 10 15 25

21. The number if diapers changed per day are as follows.

12 15 8 6 12 10 14 13 8 10 15 14 9

Applications

Solve.

22. Brenda is applying to medial schools that only accept applicants who score in the top 10% on the MCAT. Brenda receives her MCAT score that indicates that she scored at the 80th percentile. Will Brenda meet the criteria for the medical schools she is applying to?
23. On a recent standardized test, Carlos scored at the 80th percentile, Alessandro scored at the third quartile, and Isabella scored at the 82nd percentile. Which of the three had the best test score?
24. Two English classes took the same exam. Both classes had a mean score of 85, but one class had a standard deviation of 3 while the other had a standard deviation of 5. What conclusion can be drawn about the exam scores of the two classes?
25. A statistics class recently took an exam that resulted in a mean of 82. If the standard deviation for the exam scores is 3.5, what does that indicate?

Writing & Thinking

26. Given the following data set, what would be a better measure of dispersion, the range or standard deviation? Why?

45 48 46 45 21 47 44 43 48 49 59 43

27. Give an example of two data sets where the range is the same but the standard deviation is different.
28. Explain, in your own words, what standard deviation indicates about a data set.