

Using Measures of Center and Variability to Compare Data

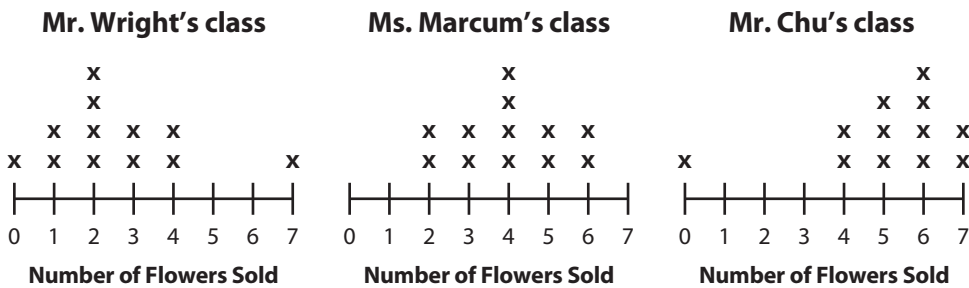
Name: _____

Prerequisite: Shape of Data Points on a Graph

Study the example showing how to describe the shape of a graph. Then solve problems 1–7.

Example

Twelve students in each of three different seventh-grade classes sell flowers to raise money for a class trip. The line plots for each class are shown. Each student is represented by one X. Describe the shape of the graph for Ms. Marcum's class.



The graph for Ms. Marcum's class is *symmetrical* because the same number of data points fall above and below the *peak* at 4.

- 1 Describe the shapes of the graphs for Mr. Wright's class and Mr. Chu's class.

- 2 Which graph does *not* include an outlier? Explain.

Vocabulary

skewed a graph in which most of the data points are clustered near the lower values or the higher values.

cluster a group of data points that crowd near each other.

outlier a data point that is far away from other data points.

Solve.

Use the following situation for problems 3–6.

Joe asked some of his friends how many movies he or she watched last month. The table shows Joe's results.

Number of Movies Watched	1	2	3	4	5	6	7	8
Number of Friends	1	0	0	2	2	4	2	1

- 3** Graph the data points on a line plot.
- 4** List any outliers in the data. Explain why each value you list is an outlier.
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- 5** At what spinner number does a peak occur? _____
- 6** Describe the shape of the line plot.
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- 7** Write a problem in which data are collected and graphed and in which the data are skewed. Include a data table and a graph.

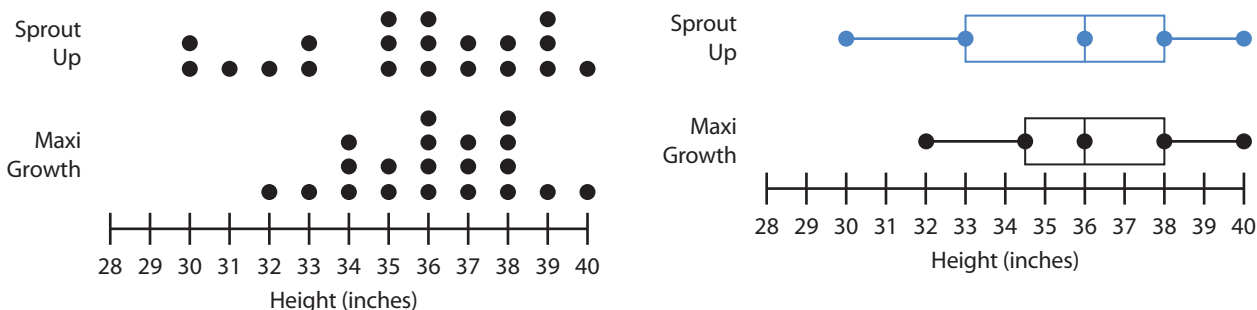
Compare Data Sets

Study the example showing how to compare data sets.
Then solve problems 1–8.

Example

Rob wanted to compare the effectiveness of two different brands of fertilizer, Maxi Growth and Sprout Up. He put Maxi Growth on one corn field and an equal amount of Sprout Up on another.

At the end of a month, he measured the height of 20 plants at random from each field. Rob made stacked dot plots and box plots. How can you use the graphs to compare the data?



You can use the dot plot to find and compare the means and the box plot to find and compare the medians. You can also use the graphs to compare the variability of the data.

- Find the mean of each brand and then compare the means and medians of the two brands.

- Which brand has greater variability? Explain.

- Which fertilizer seems to be more effective? Explain.



Solve. Use the following situation for problems 4–8.

Young High School and Valley High School are training for a 200-meter race. The average race times, in seconds, of the top 9 sprinters for each school are shown in the table.

Valley High School	21.0	22.7	21.6	23.0	22.8	22.4	22.2	23.3	22.4
Young High School	22.6	23.1	23.4	22.5	22.8	22.4	21.9	23.0	23.2

4 Draw stacked dot plots of the data.

5 Draw stacked box plots of the data.

6 Calculate the mean for each school to the nearest tenth.

7 Which team seems more consistent? Explain.

8 Which team do you think is more likely to win? Use your answers to problems 4–6 to explain your answer.
(Hint: A lower time indicates a faster speed.)

Using Measures of Center and Variability to Compare Data

Solve the problems.

- 1 Gina and Katrina measured the volume of water produced in several trials of a science experiment. The volumes that they measured are in the table.

Trial	1	2	3	4	5
Volume (cm ³)	27	26	4	25	26

Is one of the data values unlike the others?



Is the mean or the median a better measure for a typical amount of water produced in the experiment? Explain.

- 2 Draw stacked dot plots that have the same shape and center but different spreads.

Are the dots on a dot plot with a large spread close together or far apart?



- 3 Donato lists his scores on this semester's math quizzes: 82, 94, 87, 98, 73, 77, 86, 87, 85, 84. What is the interquartile range of the data?

- A 1.5 C 5
B 3.5 D 25

How do you calculate the interquartile range?



Jack chose **B** as the correct answer. How did he get that answer?



Solve.

Use this situation for problems 4–5.

The monthly average high temperatures in °F for Miami, FL are: 76, 78, 80, 83, 87, 89, 91, 91, 89, 86, 82, 78. The monthly average high temperatures in °F for Jacksonville, FL are: 65, 69, 74, 80, 87, 90, 92, 92, 88, 81, 74, 67.

- 4** Draw stacked box plots of the data.

Begin by arranging each set of data in order from least to greatest.

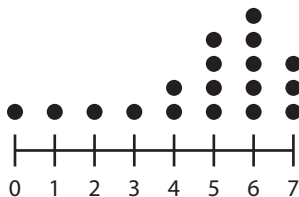


- 5** Compare the centers, ranges, and interquartile ranges of the data sets. What do they tell you about the temperatures of Miami and Jacksonville?

Which measure of center does a box plot show?



- 6** Tell whether each statement about the graph is *True* or *False*.



- a. The graph is symmetric. ☐ True ☐ False
- b. A peak occurs at 6. ☐ True ☐ False
- c. The mean is 5. ☐ True ☐ False

What is the shape of a symmetric distribution?

