

BOX-AND-WHISKER PLOT

PACKET

NAME _____

Make a Box-and-Whisker Plot

Use the following data to make a box-and-whisker plot.

14, 21, 19, 12, 13, 24, 26, 19, 15, 25, 19

Step 1: Order the data from least to greatest.

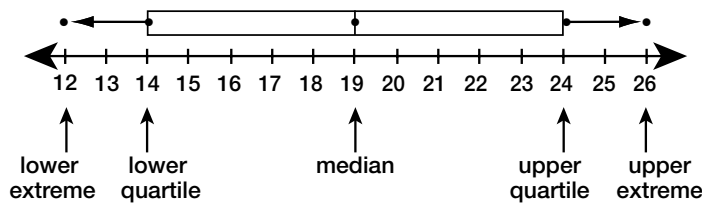
Step 2: Circle the median. Then find the upper and lower **quartiles**. Imagine breaking the data set into two parts at the median. The quartiles are the medians of the two parts.

Step 3: Circle the **extremes** – the greatest and least values of the data set.

Step 4: Draw a number line that includes all of the numbers in the data set. Above the line, draw points for the median, quartiles, and extremes.

Step 5: Draw a box that begins at the lower quartile and ends at the upper quartile. Draw a line through the box at the median.

Step 6: Draw whiskers from both ends of the box. The whiskers end at the extremes.



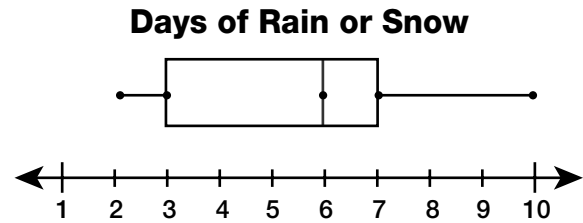
Use the data set below for Problems 1–6.

58, 71, 51, 67, 58, 55, 53, 57, 58, 62, 65

1. What is the median of the data set? _____
2. What are the upper and lower quartiles? _____
3. What are the extremes of the data set? _____
4. Draw a box-and-whisker plot to display the data.
5. How much of the data are in the box? _____
6. How much of the data are in the whiskers? _____

Box-and-Whisker Plots

Maria recorded the number of days it rained or snowed each month during the past year. This box-and-whisker plot displays her data.



The **extremes** tell you

- the least number of days it rained or snowed in a month was 2.
- the greatest number of days it rained or snowed in a month was 10.

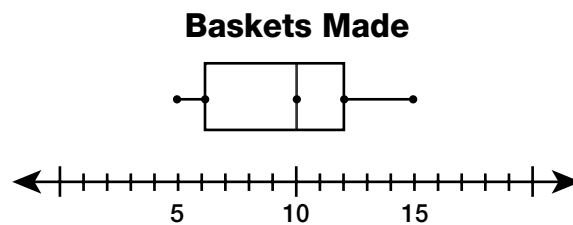
The **median** tells you

- $\frac{1}{2}$ of the months had over 6 days of rain or snow.
- $\frac{1}{2}$ of the months had fewer than 6 days of rain or snow.

The **data clusters** tell you

- $\frac{1}{4}$ of the data clusters between 2 and 3 days.
- $\frac{1}{4}$ of the data clusters between 6 and 7 days.

Use the box-and-whisker plot below for Problems 1–5.



1. What are the least and greatest number of baskets made? _____
2. What is the median number of baskets made? _____
3. What are the upper and lower quartiles for the data? _____
4. Where are the data clustered? _____
5. What do the extremes tell you about the number of baskets made?

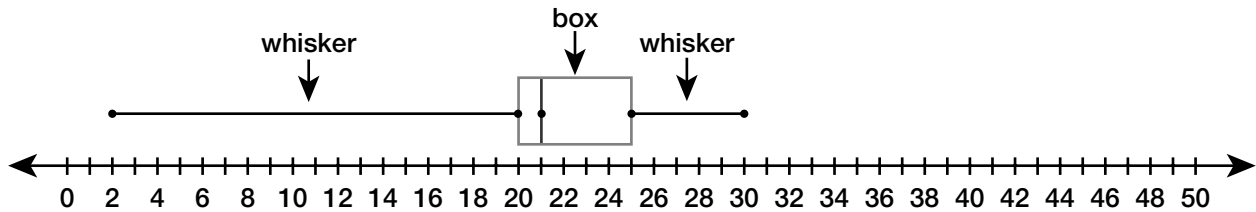
Box-and-Whisker Plots

How to Interpret a Box-and-Whisker Plot

Ask yourself:

- Where do I find the quartiles?
- What do the lengths of the whiskers and box parts mean?

Use the box-and-whisker plot for Problems 1–8.



1. What is the lower extreme? _____
2. What is the lower quartile? _____
3. What is the median of the data set? _____
4. What is the upper quartile? _____
5. What is the upper extreme? _____
6. What is the range between the lower and upper quartile? _____
7. For what range are the data most clustered? _____
8. For what range are the data most spread out? _____

Problem Solving

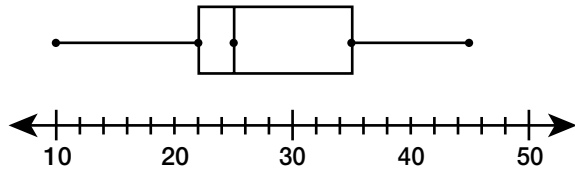
Show Your Work

9. Write a set of 15 scores that this box-and-whisker plot could represent.

Box-and-Whisker Plots

Use the box-and-whisker plot for Problems 1–8.

Number of Minutes Needed to Read a Chapter



1. What is the lower extreme? _____
2. What is the upper extreme? _____
3. What is the median? _____
4. What is the lower quartile? _____
5. What is the upper quartile? _____
6. What is the range between the lower and upper quartile? _____
7. For what range are the data most clustered? _____
8. For what range are the data most spread out? _____

Test Prep

10. Which number could you not read from a box-and-whisker plot?

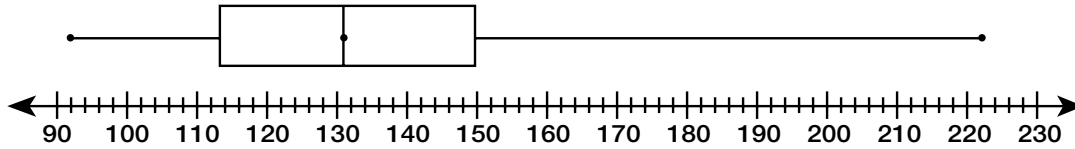
- | | |
|---------------------|-----------------------------|
| A the median | C the range |
| B the mean | D the upper quartile |

11. How could you identify an outlier from a box-and-whisker plot?

Box-and-Whisker Plots

Use the box-and-whisker plot to solve.

Length of Best Picture Winners (minutes)



Show Your Work

- The shortest film to win an Academy Award® for Best Picture was *Marty*, which won the award in 1955. How long was this movie?

- Is the median time for Best Picture winners greater or less than two hours? By how much?

- One film reviewer looked at this box-and-whisker chart and wrote, "About 25% of all Best Picture winners are more than 2 hours 41 minutes long." Do you agree? Why or why not?

- Cleon wants to find out what running time is shared by the most Best Picture winners. Can he use this box-and-whisker plot to find an answer? Why or why not?

Make a Box-and-Whisker Plot

How to Make a Box-and-Whisker Plot

- Step 1:** Order the data from least to greatest and find the median.
- Step 2:** Find the upper and lower quartiles, or the medians of each half of the data set.
- Step 3:** Find the extremes, or the greatest value and the least value in the data set.
- Step 4:** Draw a number line that begins with the least value and ends with the greatest value in the data set.
- Step 5:** Plot a point at the median, upper quartile, lower quartile, and extremes.
- Step 6:** Draw a box using the lower and upper quartiles as sides. Then draw a vertical line segment through the median.
- Step 7:** Draw a horizontal line from the lower extreme to the lower quartile. Draw another horizontal line from the upper quartile to the upper extreme.

Use the data set for Problems 1–5.

29, 35, 28, 33, 38, 29, 29, 30, 31, 29, 27

1. Order the data from least to greatest and find the median. _____
2. What are the upper and lower quartiles? _____
3. What are the extremes? _____
4. Make a box-and-whisker plot to display the data.



Problem Solving

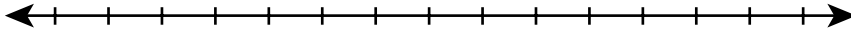
Show Your Work

5. In a box-and-whisker plot, what fraction of the data set is included in the box? in the two whiskers?

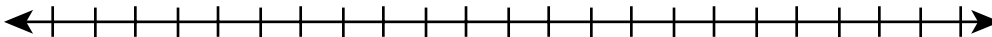
Make a Box-and-Whisker Plot

Make a box-and-whisker plot for each set of data.

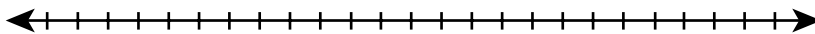
1. 15, 21, 16, 15, 14, 8, 16, 15, 15, 17, 18, 14



2. 100, 110, 110, 120, 90, 130, 90, 100, 110, 110, 120, 110, 90, 40, 130



3. 1, 9, 17, 12, 10, 15, 14, 15, 24, 16, 14



2-6

Study Guide and Intervention

Box-and-Whisker Plots

A **box-and-whisker plot** is a diagram that divides data into four equal parts. To do this, first find the median of the data, and then find the median of the lower half, called the **lower quartile**, and the median of the upper half, called the **upper quartile**.

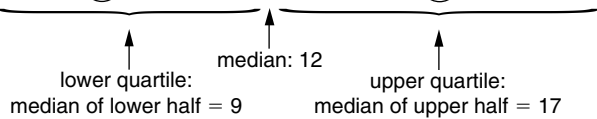
EXAMPLE 1 Make a box-and-whisker plot of the data below.

12, 23, 6, 17, 9, 10, 19, 7, 11, 15, 7, 12, 13, 20

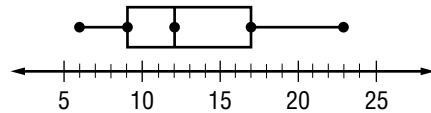
Step 1 Order the data from least to greatest.

6, 7, 7, 9, 10, 11, 12, 12, 13, 15, 17, 19, 20, 23

Step 2 Find the median and the quartiles.



Step 3 Draw a number line and graph the values you found in Step 2 as points above the line. Also graph the least value (**lower extreme**) and the greatest value (**upper extreme**).

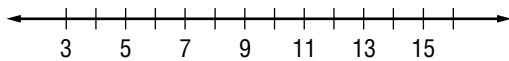


Step 4 Draw the box and whiskers.

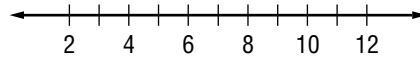
EXERCISES

Make a box-and-whisker plot for each set of data.

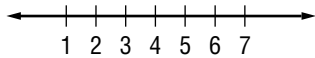
1. 15, 16, 7, 8, 5, 5, 3, 4, 8,
12, 10, 9, 6, 13



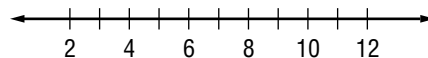
2. 4, 6, 3, 7, 10, 11, 4, 5, 6, 2, 7



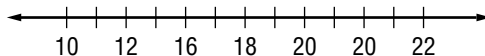
3. 1, 5, 2, 2, 6, 3, 7



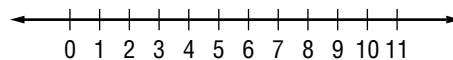
4. 8, 2, 7, 4, 12, 8, 11



5. 17, 22, 11, 11, 11, 10, 19,
18, 16, 11, 18



6. 3, 5, 1, 4, 2, 4, 3, 5, 2, 1



2-6

Practice: Skills

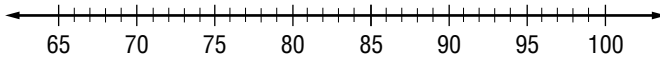
Box-and-Whisker Plots

SPORTS For Exercises 1–6, refer to the table at the right. It shows the regular season games lost by each professional baseball team in the National League in 2001.

| Number of Losses | | | |
|------------------|----|----|----|
| 74 | 76 | 80 | 86 |
| 69 | 69 | 74 | 94 |
| 100 | 70 | 72 | 76 |
| 89 | 94 | 96 | 83 |

1. Find the lower extreme, LQ, median, UQ, and upper extreme.

2. Draw a box-and-whisker plot of the data.



3. What fraction of the data is between 73 and 78?

4. Between what two numbers is the largest range of the four quartiles?

5. Find the interquartile range.

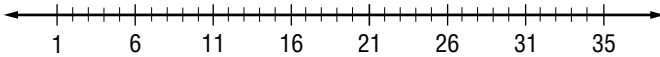
6. Are there any outliers? If so, identify them.

LIFE SCIENCE For Exercises 7–12, refer to the table at the right. It shows average life spans of 21 mammals.

| Life Span (yr) | | | | |
|----------------|----|----|----|----|
| 5 | 12 | 4 | 3 | 12 |
| 12 | 6 | 5 | 8 | 35 |
| 7 | 8 | 12 | 10 | 12 |
| 10 | 3 | 7 | 1 | 12 |
| 10 | | | | |

7. Find the lower extreme, LQ, median, UQ, and upper extreme.

8. Draw a box-and-whisker plot of the data.



9. What fraction of the data is between 5 and 12?

10. Find the interquartile range.

11. What are the limits on outliers?

12. Are there any outliers? If so, identify them.

2-6**Practice: Word Problems*****Box-and-Whisker Plots***

SOCCER For Exercises 1–6, use the table below. It shows the number of wins in a recent major league soccer season.

| Major League Soccer Wins | | | | | |
|--------------------------|----|----|---|----|----|
| 16 | 13 | 7 | 8 | 10 | 4 |
| 14 | 13 | 11 | 5 | 16 | 13 |

| | |
|--|---|
| <p>1. Find the lower extreme, LQ, median, UQ, and upper extreme.</p> | <p>2. Construct a box-and-whisker plot of the data in the table.</p> |
| <p>3. What fraction of the data is greater than 7.5?</p> | <p>4. What fraction of the data is between 7.5 and 13.5?</p> |
| <p>5. Determine the interquartile range.</p> | <p>6. Use the interquartile range to determine the limits for the outliers. Are there any outliers?</p> |