

Stem-and-Leaf Plots

In a stem-and-leaf plot, the data are organized from least to greatest. The digits of the least place value usually form the leaves, and the next place value digits form the stems.

EXAMPLE 1 Make a stem-and-leaf plot of the data below. Then find the range, median, and mode of the data.

42, 45, 37, 46, 35, 49, 47, 35, 45, 63, 45

Order the data from least to greatest.

35, 35, 37, 42, 45, 45, 45, 46, 47, 49, 63

The least value is 35, and the greatest value is 63. So, the tens digits form the stems, and the ones digits form the leaves.

range: greatest value $-$ least value = $63 - 35$ or 28

median: middle value, or 45

mode: most frequent value, or 45

Stem	Leaf
3	5 5 7
4	2 5 5 5 6 7 9
5	
6	3

$$6|3 = 63$$

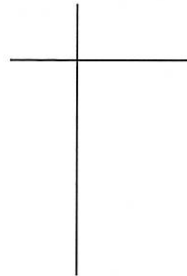
Make a stem-and-leaf plot for each set of data. Then find the range, median, and mode of the data.

23, 36, 25, 13, 24, 25, 32, 33, 17, 26, 24

Range _____

Median _____

Mode _____

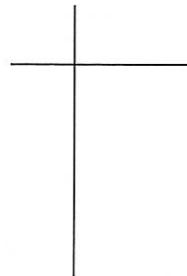


347, 334, 346, 330, 348, 347, 359, 344, 357

Range _____

Median _____

Mode _____



HOT DOGS For Exercises 5–7, use the stem-and-leaf plot at the right that shows the number of hot dogs eaten during a contest.

Stem	Leaf
0	8 8 9
1	1 2 2 4 7 7 7
2	1 1 2

$$2|1 = 21$$

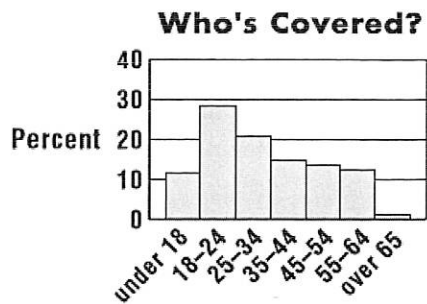
5. How many hot dogs are represented on the stem-and-leaf plot?
6. What is the range of the number of hot dogs eaten?
7. Find the median and mode of the data.

Histograms

A **histogram** uses bars to display numerical data that have been organized into equal intervals.

Example

The table shows the percent of people in several age groups who are not covered by health insurance. Make a histogram of the data.

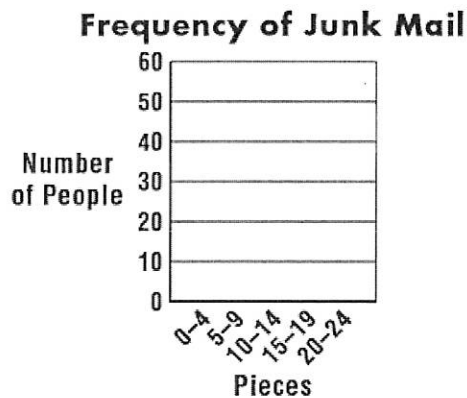


Age	Percent
under 18	12.4%
18-24	28.9%
25-34	20.9%
35-44	15.5%
45-54	14.0%
55-64	12.9%
over 65	1.2%

Make a histogram of the data below.

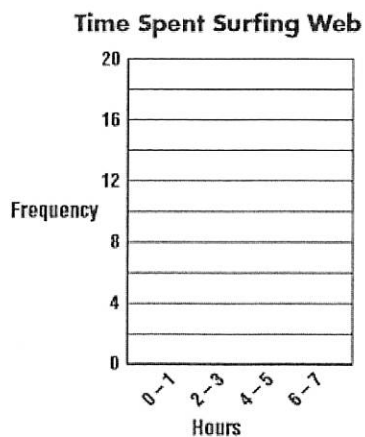
1.

Pieces of Junk Mail	Frequency
0-4	25
5-9	35
10-14	50
15-19	40
20-24	15



2.

Time Spent Surfing the Web (in hours per day)	Frequency
0-1	20
2-3	18
4-5	2
6-7	1



Measures of Spread

In previous courses, you learned about two measures of center: the mean and the median. The mean is the “balance point” of a data set. It is calculated by adding up the values and dividing by the number of values. The mean is the middle value when the data points are placed in order from least to greatest.

When the data points are *symmetric*, the mean is very close to the median. In fact, if it is perfectly symmetric, the mean equals the median. Consider the data set {1, 2, 2, 3, 3, 3, 4, 4, 5, 6}.

1. What is the median?
2. What is the mean?
3. Graph the data points on a dot plot. Draw the line of symmetry.

When the graph is *skewed* (or asymmetric), the mean and the median will differ. Consider the data set {1, 2, 3, 4, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6}.

1. What is the median?
2. What is the mean?
3. Graph the data points on a dot plot.

A data set is *skewed left* if the data is spread out longer (like a tail) on the left side, and *skewed right* if the data is spread out longer (like a tail) on the right side.

4. Is the data above skewed left or right?
5. Come up with a data set for which the mean is greater than the median. Draw a dot plot.
6. Is the data above skewed left or right?

Because *very* different distributions can have the same measures of center, there is a need for a second type of measure: measures of spread. Measures of spread tell us how “different” the data point are from one another, or said differently, how “clumped” (or not clumped) they are around the center. For example, consider the following two data sets:

$$\{5, 5, 5, 5, 5, 5, 5, 5, 5\}$$
$$\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

1. Calculate the mean for each set.
2. Graph each set on a dot plot.

Both sets have the same mean, but the second set is much more “spread out” than the first. In fact, the first set is not spread out at all: any reasonable measure of “spread” for this set would be “0”.

Both the mean and the median have corresponding measures of spread.

Homework Exercises

Determine the mean, median, and mode of the data shown in each stem-and-leaf plot.

Stem	Leaf
0	1 2 2 3
1	3 4 5 5
2	0 0 0 1 3
	2 0 = 20

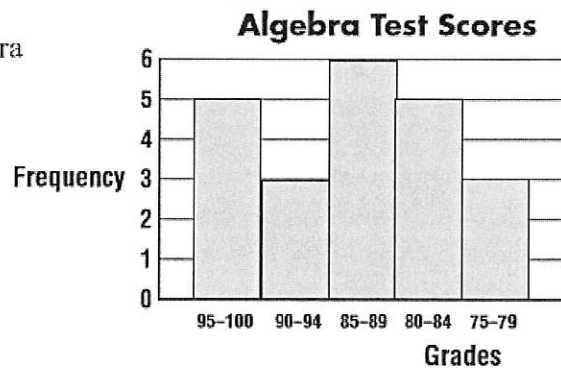
Stem	Leaf
2	0 0 0 2 3 5 7
3	1 2
4	0
	4 0 = 40

Stem	Leaf
22	1 1 2 7
23	3 3 9
24	0 6 8
	24 0 = 240

Stem	Leaf
0	1 3 3 4 7
1	2 2 2 4 5 6
2	0 0 0 1
	2 0 = 20

Use the histogram at the right to answer each question.

3. How many students took the algebra test?
4. Which grade has the most test scores?
5. Which grades have the same number of test scores?
6. How many more students earned 85–89 than earned 80–84?
7. Make a frequency table of the algebra scores.



***A survey was taken that asked people their height in inches.
The data are shown below.***

68	69	72	64	74	56	62	58
69	65	70	59	71	67	66	64
73	78	70	52	61	68	67	66

8. Make a frequency table and histogram of the data. Use the intervals 51-55, 56-60, 61-65, 66-70, 71-75, and 76-80.

9. How many heights are in the 66-70 interval?

10. How many people in the survey are taller than 5 feet?

11. How many people in the survey are shorter than 5 feet?

12. What interval has the greatest number of heights?

13. How many people were surveyed?