

AP Stats

Chapter 1 1.2 (day 3) Notes Outline

How to make a histogram:

Foreign-Born Residents

Making a histogram

What percent of your home state's residents were born outside the United States? A few years ago, the country as a whole had 12.5% foreign-born residents, but the states varied from 1.2% in West Virginia to 27.2% in California. The following table presents the data for all 50 states.²¹ The *individuals* in this data set are the states. The *variable* is the percent of a state's residents who are foreign-born. It's much easier to see from a graph than from the table how your state compared with other states.

| State | Percent | State | Percent | State | Percent |
|-------------|---------|----------------|---------|----------------|---------|
| Alabama | 2.8 | Louisiana | 2.9 | Ohio | 3.6 |
| Alaska | 7.0 | Maine | 3.2 | Oklahoma | 4.9 |
| Arizona | 15.1 | Maryland | 12.2 | Oregon | 9.7 |
| Arkansas | 3.8 | Massachusetts | 14.1 | Pennsylvania | 5.1 |
| California | 27.2 | Michigan | 5.9 | Rhode Island | 12.6 |
| Colorado | 10.3 | Minnesota | 6.6 | South Carolina | 4.1 |
| Connecticut | 12.9 | Mississippi | 1.8 | South Dakota | 2.2 |
| Delaware | 8.1 | Missouri | 3.3 | Tennessee | 3.9 |
| Florida | 18.9 | Montana | 1.9 | Texas | 15.9 |
| Georgia | 9.2 | Nebraska | 5.6 | Utah | 8.3 |
| Hawaii | 16.3 | Nevada | 19.1 | Vermont | 3.9 |
| Idaho | 5.6 | New Hampshire | 5.4 | Virginia | 10.1 |
| Illinois | 13.8 | New Jersey | 20.1 | Washington | 12.4 |
| Indiana | 4.2 | New Mexico | 10.1 | West Virginia | 1.2 |
| Iowa | 3.8 | New York | 21.6 | Wisconsin | 4.4 |
| Kansas | 6.3 | North Carolina | 6.9 | Wyoming | 2.7 |
| Kentucky | 2.7 | North Dakota | 2.1 | | |

low 1.2
high 27.2
classes of 5 wide
beg. @ zero

1. Divide data into classes of equal widths.

0-5 5-10 10-15 15-20 ...

5%

0 to <5 5 to <10 10 to <15...

more useful to compare distributions.

2. Find the count (frequency) or percent (relative frequency) of individuals in each class.

| Frequency table | |
|-----------------|-------|
| Class | Count |
| 0 to <5 | 20 |
| 5 to <10 | 13 |
| 10 to <15 | 9 |
| 15 to <20 | 5 |
| 20 to <25 | 2 |
| 25 to <30 | 1 |
| Total | 50 |

| Relative frequency table | |
|--------------------------|---------|
| Class | Percent |
| 0 to <5 | 40 |
| 5 to <10 | 26 |
| 10 to <15 | 18 |
| 15 to <20 | 10 |
| 20 to <25 | 4 |
| 25 to <30 | 2 |
| Total | 100 |

$$\frac{20}{50} = .4$$

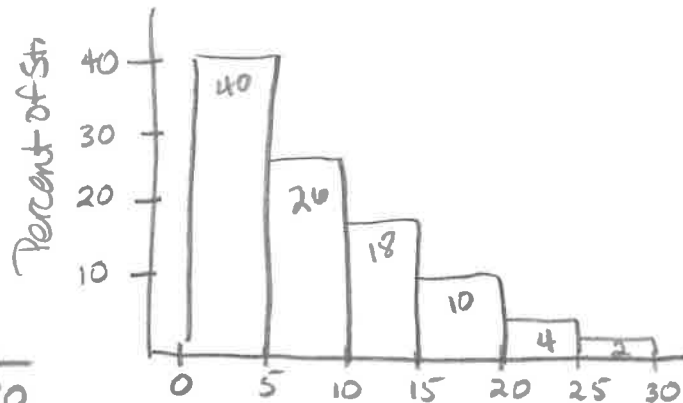
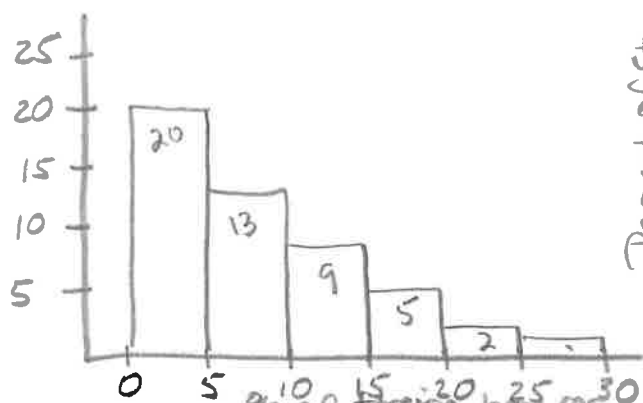
$$\frac{13}{50} = .26$$

now -
look @ table
and count

3. Label and scale your axes and draw the histogram.

Number of States

Percent of foreign born residents in 50 states



What do the histograms tell us about the percent of foreign born residents in the states? (cuss and bs!)

C: From the graph we see the mp would fall somewhere in the 5% to 9.9% class. (Actual mp = 6.1%)

U: We do not have any observations outside the over all pattern of distribution

S: The dist. is skewed to the right & unimodal. Most states have fewer than 10% of foreign born residents, but several have much higher percents.

S: The % of foreign born residents in the states varies from 1.2% to 27.2%

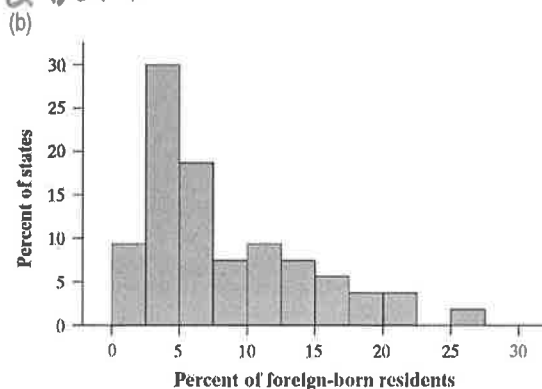
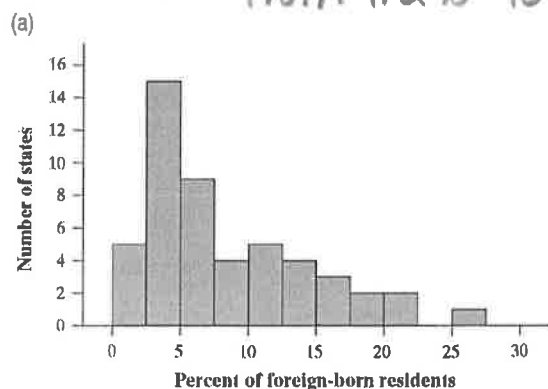
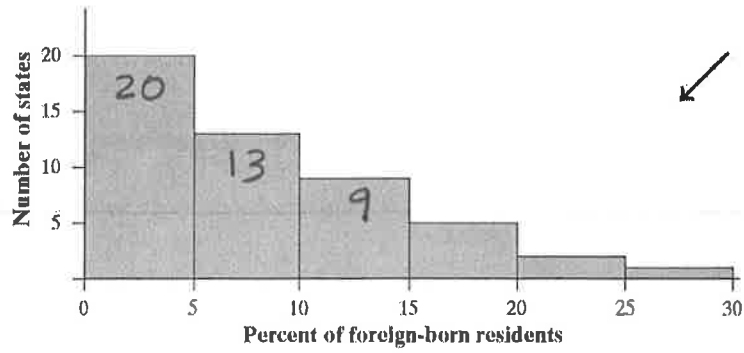
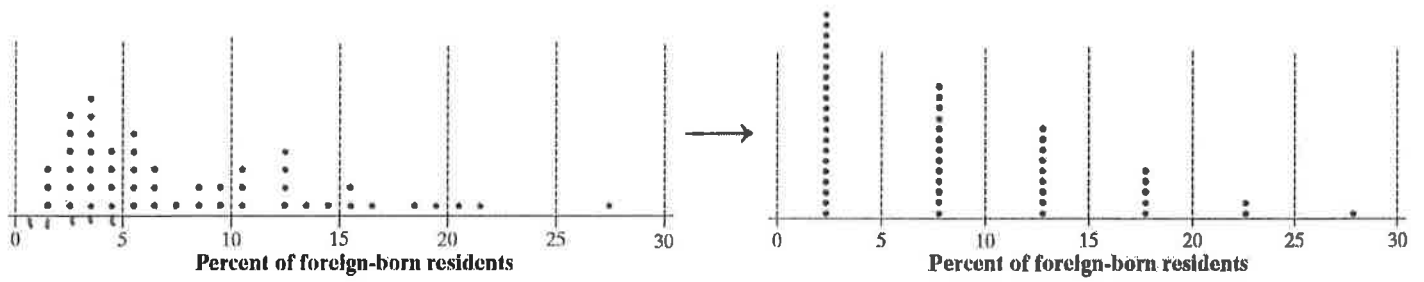


FIGURE 1.17 (a) Frequency histogram and (b) relative frequency histogram of the distribution of the percent of foreign-born residents in the 50 states, with classes half as wide as in Figure 1.16.

Here are some important things to consider when you are constructing a histogram:

- Our eyes respond to the area of the bars in a histogram, so be sure to choose classes that are all the same width. Then area is determined by height, and all classes are fairly represented.
- There is no one right choice of the classes in a histogram. Too few classes will give a "skyscraper" graph, with all values in a few classes with tall bars. Too many will produce a "pancake" graph, with most classes having one or no observations. Neither choice will give a good picture of the shape of the distribution. Five classes is a good minimum.

What are we actually doing when we make a histogram?



CALCULATOR HINTS TO MAKE A HISTOGRAM:

1. Enter data for the percent of state residents born outside the US.

- Press **STAT** and choose **Edit...**
- Type the values into list **L1**.

| L1 | L2 | L3 | L4 | L5 |
|------|----|----|----|----|
| 7 | | | | |
| 15.1 | | | | |
| 3.9 | | | | |
| 27.2 | | | | |
| 10.3 | | | | |
| 13.9 | | | | |
| 6.1 | | | | |
| 10.9 | | | | |
| 9.2 | | | | |
| 16.2 | | | | |

2. Set up a histogram in the Statistics Plot menu.

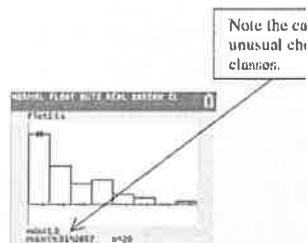
- Press **2nd** **Y=** (**STAT PLOT**).
- Press **ENTER** or **1** to go into **Plot1**.



- Adjust the settings as shown.

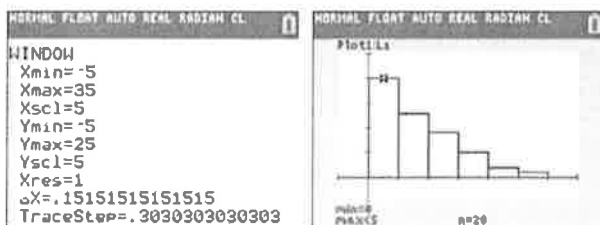
3. Use **ZoomStat** to let the calculator choose classes and make a histogram.

- Press **ZOOM** and choose **ZoomStat**.
- Press **TRACE** and **◀ ▶** to examine the classes.



4. Adjust the classes to match those in our histogram.

- Press **WINDOW** and enter the values shown below.
- Press **GRAPH**.
- Press **TRACE** and **◀ ▶** to examine the class



AP® EXAM TIP If you're asked to make a graph on a free-response question, be sure to label and scale your axes. Unless your calculator shows labels and scaling, don't just transfer a calculator screen shot to your paper.