

Sect 12.1 – Reading and Interpreting Graphs

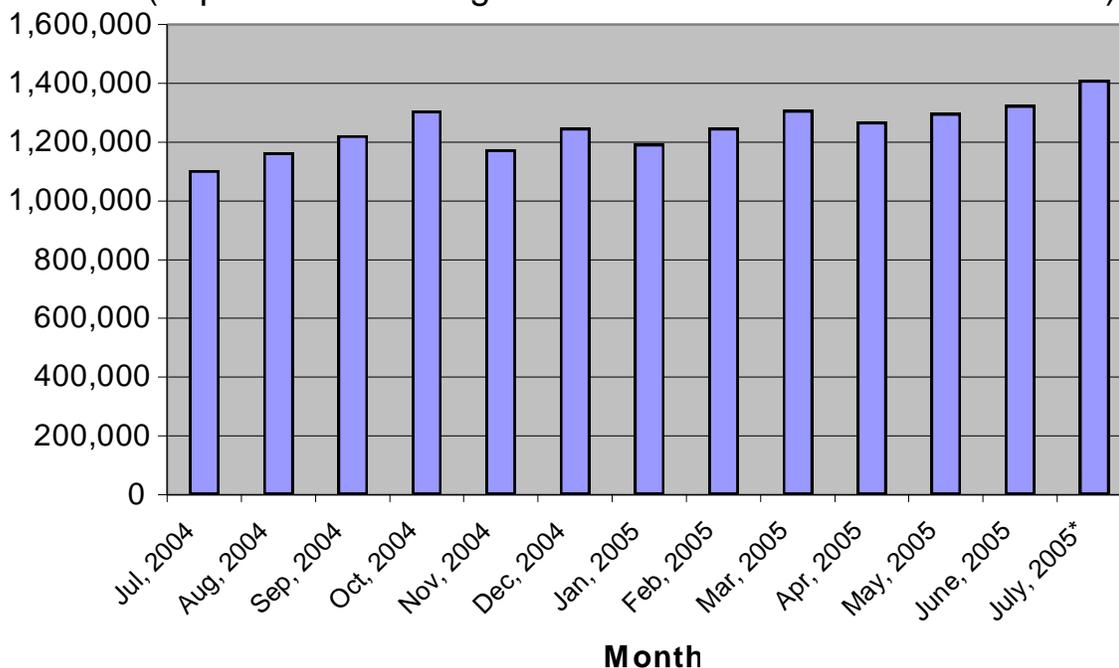
Objective #1 – Reading and Interpreting Bar Graphs

Bar graphs use bars to represent the data for different categories. Sometimes a bar graph is drawn horizontal and sometimes vertically. A bar graph may appear as a single bar graph, double bar graph, or even a triple bar graph. Let us try some examples.

Use the graph below to answer the following questions:

Ex. 1 **Number of new houses sold in the US per month**

Source: (<http://www.census.gov/const/www/newressalesindex.html>)

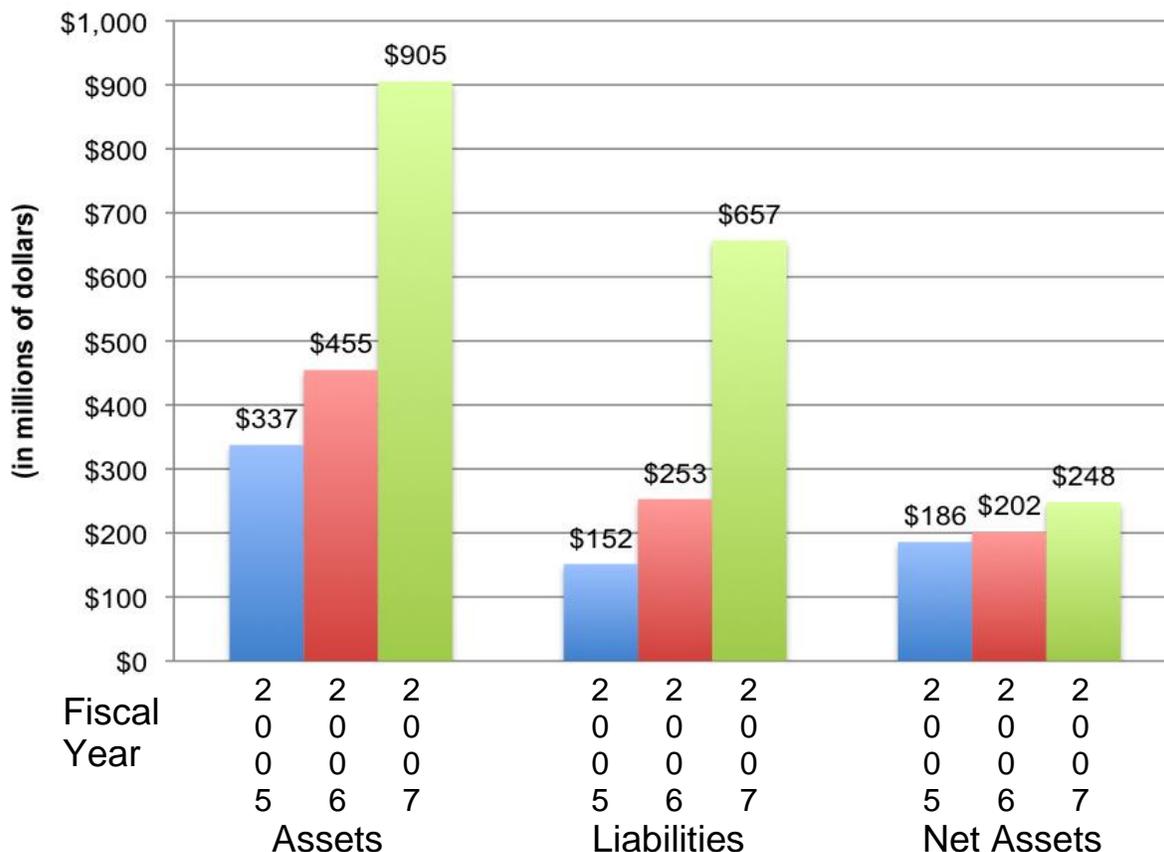


- Which month had the lowest number of new homes sold?
- Which month had the highest number of new homes sold?
- Approximately how many new homes were sold in Jan, 2005?
- What is the difference in the number of new homes sold in Oct, 2004 and Jul, 2004?

Solution:

- The first bar is the lowest. So, Jul, 2004 had the lowest.
- The last bar is the highest. So, Jul, 2005 had the highest.
- Approximately 1,200,000 homes.
- $\approx 1,300,000 - 1,100,000 = 200,000$. So, $\approx 200,000$ more new homes were sold in Oct, 2004.

Ex. 2 ACCD Schedule of Assets and Liabilities



(Source: FY 2007 Annual Financial Report at <http://www.accd.edu/district/fiscalaf/fiscalaffairs.html>)

- What was the increase in liabilities from 2005 to 2007?
- Which category had the smallest increase over the three years?
- Which category had the largest increase over the three years?
- Calculate the percent increase in net assets from 2005 to 2007.

Solution:

- $657 - 152 = \$505$ million. It increased by \$505 million.
- Net assets had the smallest increase.
- Assets had the largest increase.
- The increase in net assets was $248 - 186 = 62$.

So, we are look for 62 is what percent of 186?

$$\frac{62}{186} = \frac{p}{100} \quad (\text{cross multiply})$$

$$6200 = 186p \quad (\text{divide by 186})$$

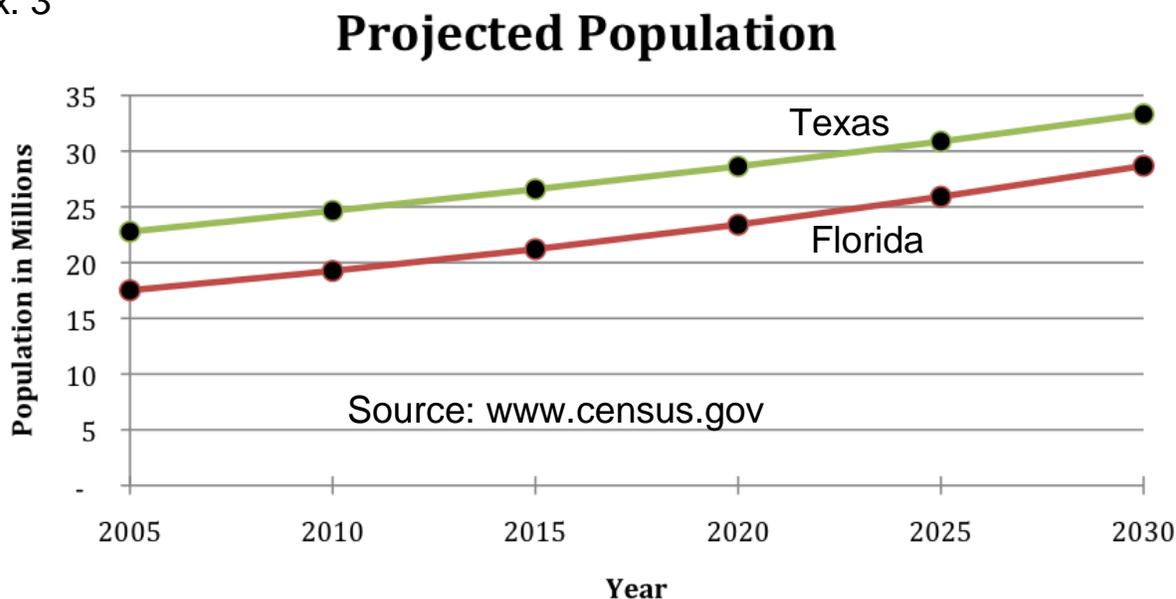
$p = 33 \frac{1}{3}\%$. The net assets increased by $33 \frac{1}{3}\%$.

Objective #2 – Reading and Interpreting Line Graphs

Line graphs use points connected by lines to represent the data for different categories. A line graph may appear as a single line graph, or as a double line graph. Let us try an example.

Use the graph below to answer the following questions:

Ex. 3



- What is the projected population of Florida in 2030?
- Approximately what year is Texas' population projected to reach 30 million people?
- If, in 2010, 8.1% of the US population will live in Texas, what will the US population be in 2010?

Solution:

- Florida's population is a little under 30 million, so it should be about 29 million people.
- The line crosses 30 million between 2020 and 2025, but it is a little closer to 2025. So, it is projected to reach 30 million in 2023.
- In 2010, Texas' population is about 25 million. So, we are looking for 25 million is 8.1% of what?

$$\frac{25}{B} = \frac{8.1}{100} \quad (\text{cross multiply})$$

$$8.1B = 2500 \quad (\text{divide by } 8.1)$$

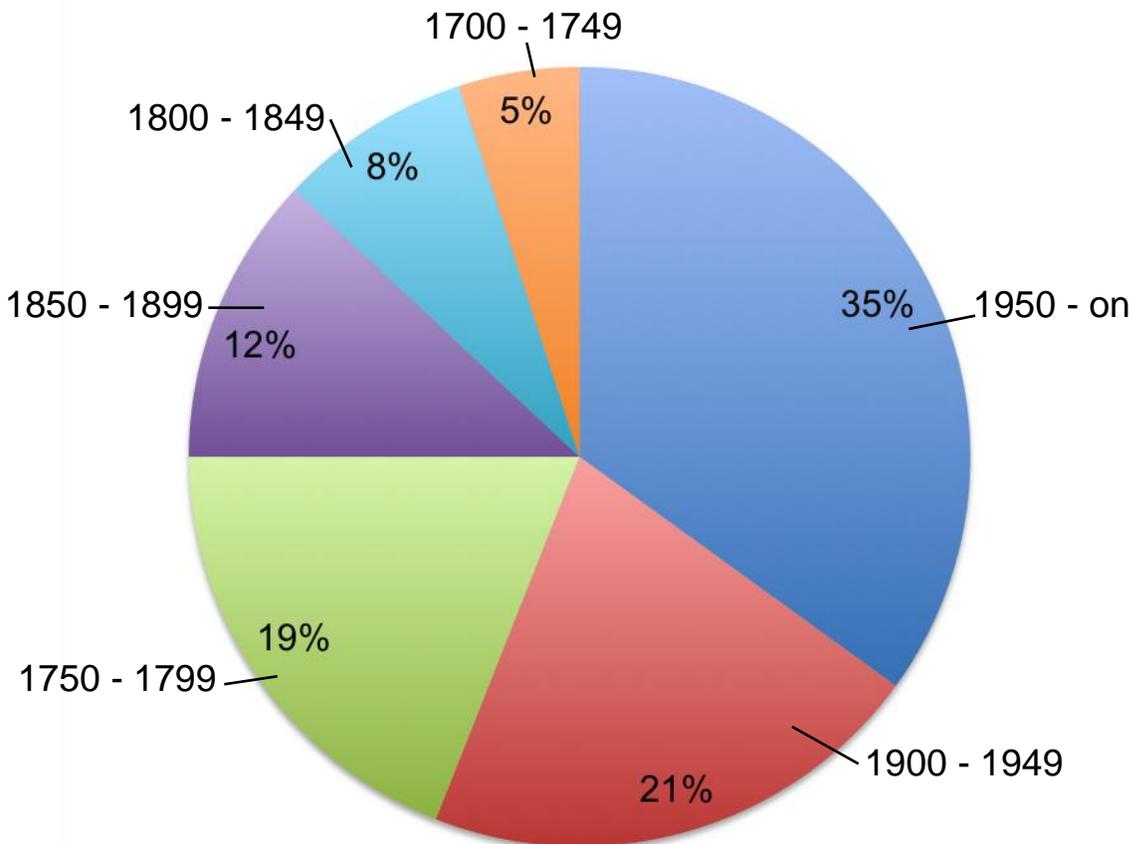
$B = 308.6\dots$ The US Population will be ≈ 310 million.

Objective #3 – Reading and Interpreting Circle Graphs (Pie Charts)

Circle graphs use sectors to represent the data for different categories. Usually, the sector is a percentage of the whole circle graph. Consider the following example.

Use the graph below to answer the following questions:

Ex. 4 Breakdown of questions on a history exam by time period



- Which time period had the most questions?
- Which time period had the least number of questions?
- If there were 200 questions on the exam, how many questions were there from 1900 – 1949?
- If there were 30 questions from the 1850 – 1899 time period, how many questions were on the exam?

Solution:

- The 1950 – on time period had the most questions.
- The 1700 – 1749 time period had the fewest questions.

- c) Since 21% of the questions came from the 1900 – 1949 time period, we are looking for what is 21% of 200?

$$\frac{A}{200} = \frac{21}{100} \quad (\text{cross multiply})$$

$$100A = 4200 \quad (\text{divide by 100})$$

$$A = 42.$$

There were 42 questions from the 1900 – 1949 time period.

- d) Since 12% of the questions came from the 1850 – 1899 time period, we are looking for 30 is 12% of what?

$$\frac{30}{B} = \frac{12}{100} \quad (\text{cross multiply})$$

$$12B = 3000 \quad (\text{divide by 12})$$

$$B = 250. \text{ There were 250 questions on the exam.}$$

Objective #4 Drawing Graphs

The key with drawing graphs is to develop appropriate categories to organize the data. Once we accomplish that, we can count the data in each category and then draw our graphs.

Use the following data to draw a bar, line, and a circle graph.

Ex. 5 A company surveyed its employees about how many miles to the gallon the car gets. Here are the results:

39, 20, 37, 28, 29, 17, 15, 42, 30, 26, 23, 32, 28, 20, 43, 38, 33, 20, 24, 19, 31, 27, 21, 27, 34, 31, 25, 22, 41, 35, 21, 36, and 29.

Solution:

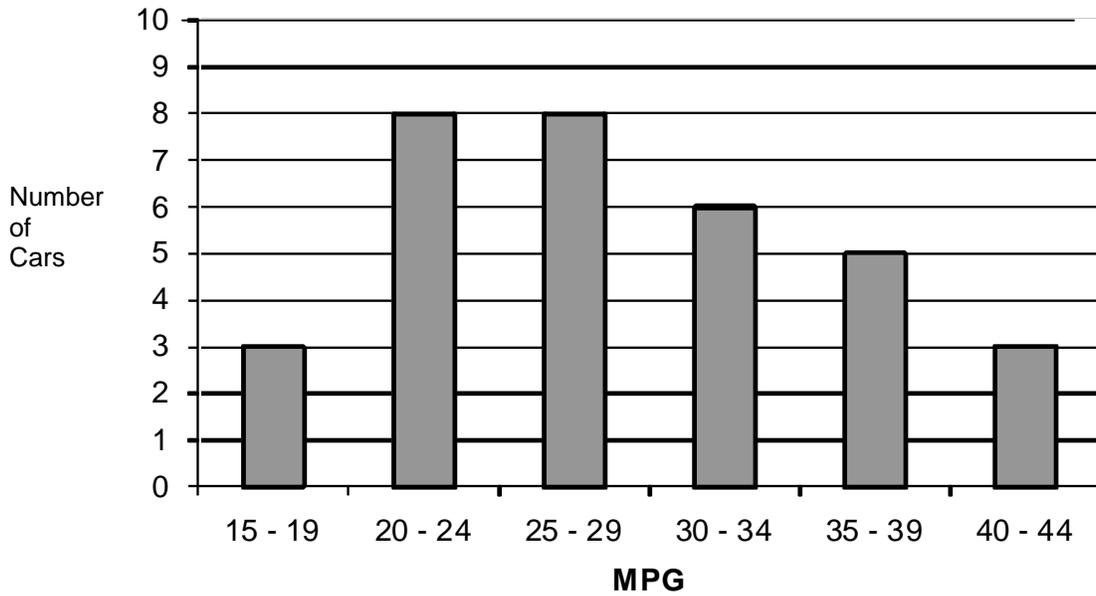
If we try to draw a bar for each individual piece of data, we would get a meaningless graph. Since the smallest number is 15 and the largest number is 43, we can group data with class width of 5 units. So, our classes are: 15 – 19, 20 – 24, 25 – 29, 30 – 34, 35 – 39, 40 – 44.

It is important to make the classes the same size so we can do an accurate comparison. Next, we need to count the number of "hits" we have in each class. We mark the data in the appropriate class:

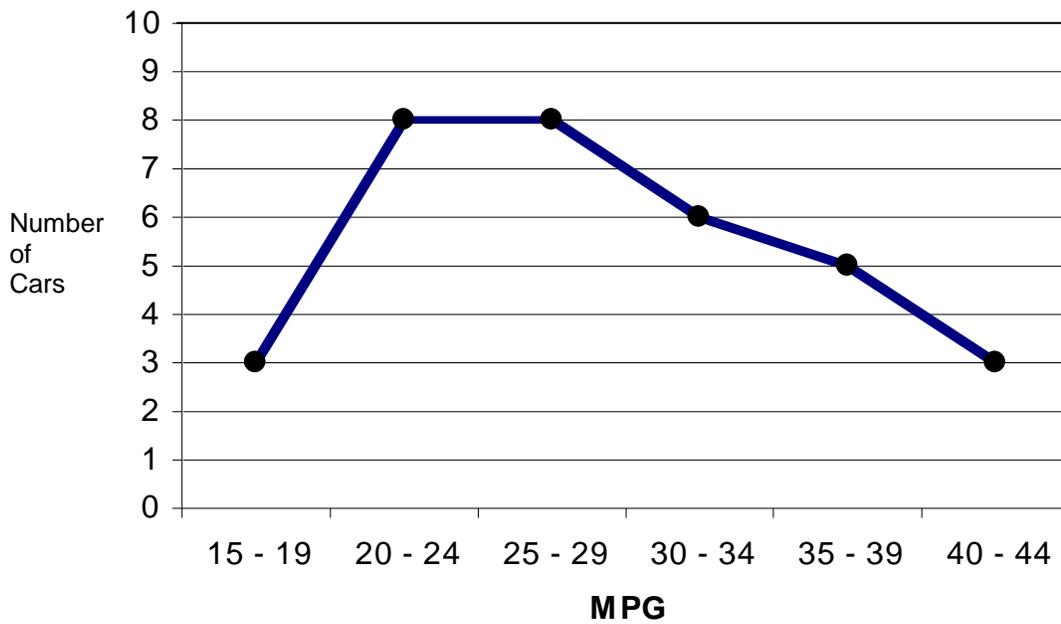
Class	Tally	Frequency
15 – 19		3
20 – 24		8
25 – 29		8
30 – 34		6
35 – 39		5
40 – 44		3

Now, we can build our bar and line graphs:

MPG of Cars



MPG of Cars



The circle graph is a little more complicated. We will need to find the total number of cars and calculate the percentage of cars in each category. Since there are 360° in a circle, we will need to multiply the percentage by 360° to find how big the area of the sector is.

The total cars is $3 + 8 + 8 + 6 + 5 + 3 = 33$

Class	Frequency	Percentage	Degrees
15 – 19	3	9.1%	32.7°
20 – 24	8	24.3%	87.3°
25 – 29	8	24.3%	87.3°
30 – 34	6	18.2%	65.5°
35 – 39	5	15.2%	54.4°
40 – 44	3	9.1%	32.7°

We can now construct our circle graph using a protractor.

MPG of Cars

