

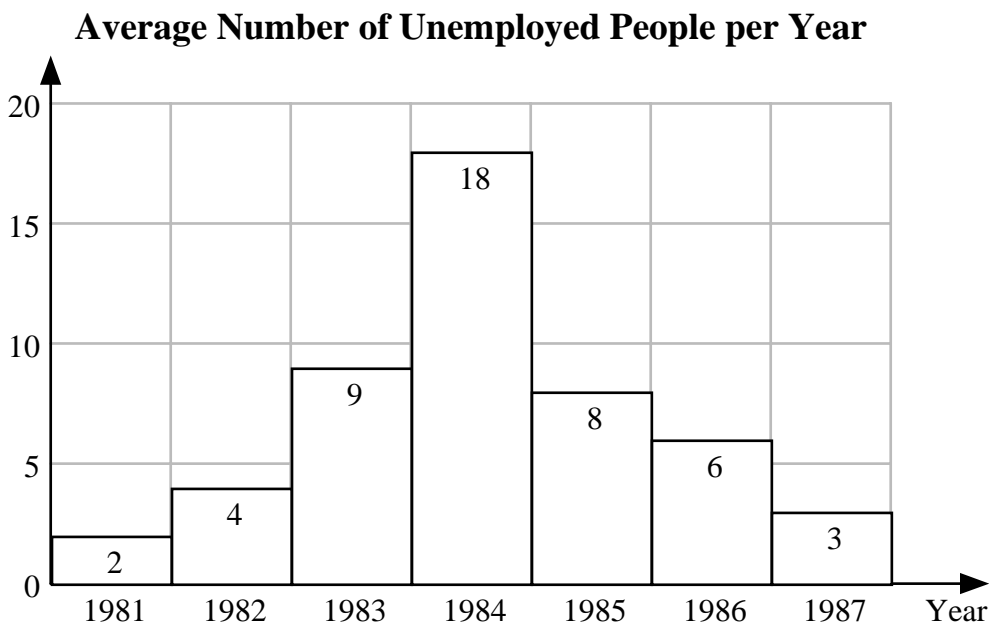
§7-3**TABLES AND GRAPHS**

Suppose a researcher collects data on the number of unemployed people in a major metropolitan city during the years 1981, 1982, 1983, 1984, 1985, 1986, and 1987. The data in its original form is summarized in the table below.

<u>Year</u>	<u>Average Number of Unemployed People</u>
1981	2,000
1982	4,000
1983	9,000
1984	18,000
1985	8,000
1986	6,000
1987	3,000

It is easier for most people to comprehend the meaning of data when it is presented graphically. For example, the data in the table above shows an increase in the average number of people unemployed through the years 1981 to 1984. Then the data shows a decrease in the number of people that are unemployed through the years 1984 to 1987.

The bar graph below was constructed to represent the data in the table above. Here it is easier to view the trend of the average number of unemployed people through the years 1981 to 1987.



Graph 1

Notice the horizontal axis is used to represent the years and the vertical axis is used to represent the average number of unemployed people. The vertical axis is labeled with integer values that are understood to be thousand's of people. For example, in the year 1985 the bar graph indicates an integer value of 8 on the vertical axis. Therefore, in the year 1985 there was an average of 8 times 1,000 = 8,000 people unemployed in that year.

The numbers on top of each bar in the graph above are generally not shown. There were placed here to ensure that the reader understands how a bar graph is read.

Example 1 Using graph 1 above, what was the average number of unemployed people for the three-year period from 1981 to 1983?

Solution The integer values for 1981, 1982 and 1983 are 2, 4 and 9. The average of these three values is $\frac{2+4+9}{3} = \frac{15}{3} = 5$. Recalling that these integer values represent thousands of people, the average number of unemployed people for the three-year period was 5,000 people.

A line graph can also be used to represent data. Below is the line graph that represents the exact same data used in Graph 1.



Graph 2

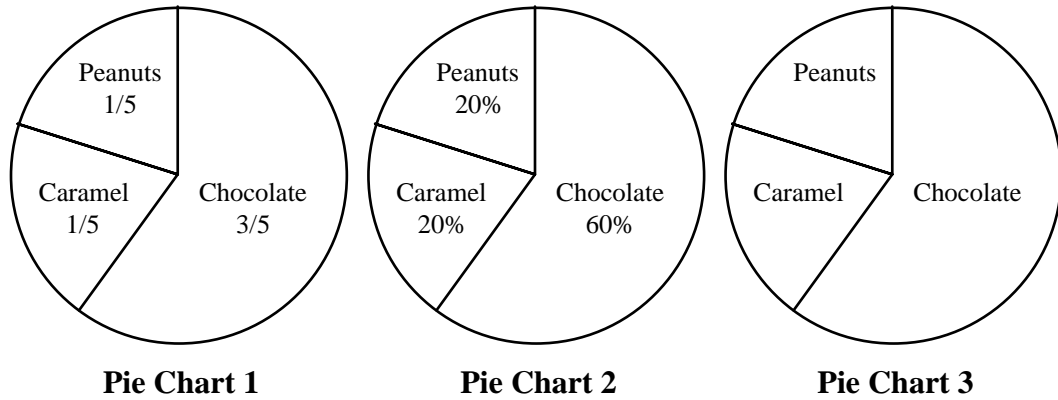
Example 2 Using the line graph above, how many years did it take for the average number of unemployed people to increase above 17,000 people.

Solution At the end of 1983 there was an average of 9,000 people unemployed. At the end of 1984 there was an average number of 18,000 people unemployed. Therefore during the 1984 year, the average number of unemployed people increased above 17,000. Hence, it took 4 years for the average number of unemployed people to increase above 17,000 people.

Example 3 Using the line graph above, during what year did the average number of unemployed people decrease the least.

Solution After 1984 the average number of unemployed people begins to decrease. In 1985 it decreased by 10,000 people. In 1986 it decreased by 2,000 people. In 1987 it decreased by 3,000 people. Therefore during 1986, the average number of unemployed people decreased the least.

The circle graph or pie graph is used to show how something is composed of different things. For example, let's look at a candy bar whose ingredients are chocolate, peanuts and caramel. For example, suppose $\frac{3}{5}$ (60%) of the candy bar is composed of chocolate, $\frac{1}{5}$ (20%) of the candy bar is composed of peanuts and $\frac{1}{5}$ (20%) of the candy bar is composed of caramel. This numerical data is represented in the pie graphs shown below.



Pie chart 1 uses fractions to describe the composition of the candy bar where pie chart 2 uses percentages. Pie chart 3 requires the reader to convert the area of the three regions to a percentage or fractional value where the entire area of the circle is equivalent to 100% or 1.

Example 4 If the total weight of the candy bar was 4.0 grams, what how many grams of chocolate are in each candy bar?

Solution Since the total weight of the candy bar is 4.0 grams and 60% of it is composed of peanuts, the weight of the peanuts alone is $(4.0) \times (0.60) = 2.4$ grams.

Example 5 If the total weight of the candy bar was 6.0 grams, what how many grams of peanuts are in each candy bar?

Solution Since the total weight of the candy bar is 6.0 grams and $\frac{1}{5}$ of it is composed of peanuts, the weight of the peanuts alone is $(6.0) \times \left(\frac{1}{5}\right) = \frac{6}{5} = 1.2$ grams.