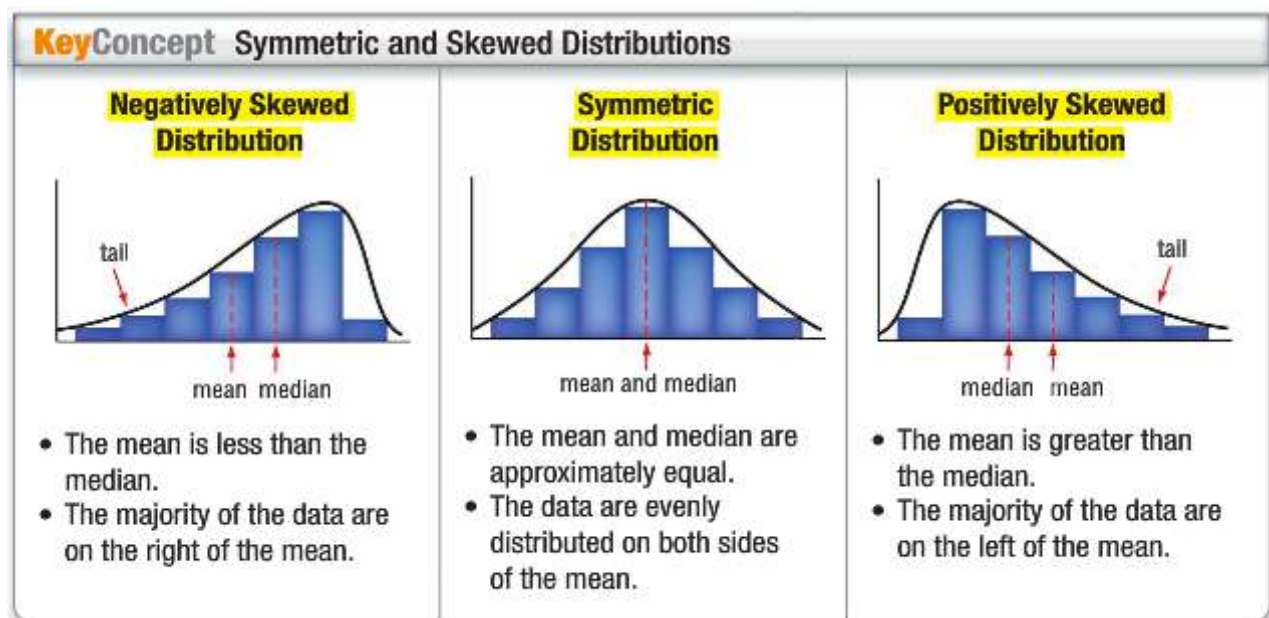


10-2 Distributions of Data

Objective: Use the shapes of distributions to select appropriate statistics. Use the shapes of distributions to compare data.

A **distribution** of data shows the observed or theoretical frequency of each possible data value. Analyzing the shape of a distribution can help you decide which measure of center or spread best describes a set of data. The shape of a distribution for a set of data can be seen by drawing a curve over its histogram.



When a distribution is symmetric, the mean and standard deviation accurately reflect the center and spread of the data. However, when a distribution is skewed, these statistics are not as reliable. Recall that outliers have a strong effect on the mean of a data set, while the median is less affected. Similarly, when a distribution is skewed, the mean lies away from the majority of the data toward the tail. The median is less affected, so it stays near the majority of the data.

When choosing appropriate statistics to represent a set of data, first determine the skewness of the distribution.

- If the distribution is relatively symmetric, the mean and standard deviation can be used.
- If the distribution is skewed or has outliers, use the five-number summary to describe the center and spread of the data.

Example 1

The prices for a random sample of personal computers are shown.

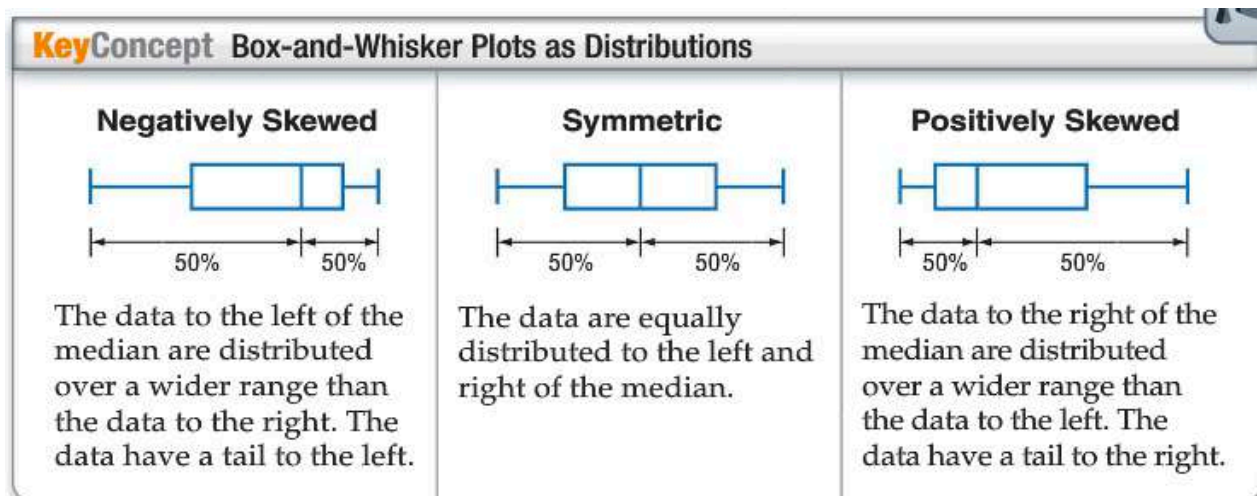
Price (dollars)							
723	605	847	410	440	386	572	523
374	915	734	472	420	508	613	659
706	463	470	752	671	618	538	425
811	502	490	552	390	512	389	621

- Use a graphing calculator to create a histogram. Describe the shape of the distribution.
- Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.



[0, 1000] scl: 100 by [0, 10] scl: 1

A box-and-whisker plot can also be used to identify the shape of a distribution. The position of the line representing the median indicates the center of the data. The “whiskers” show the spread of the data. If one whisker is considerably longer than the other and the median is closer to the shorter whisker, then the distribution is skewed.

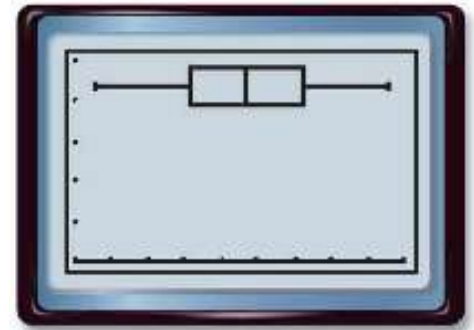


Example 2

The students in Mr. Smith’s language arts class found the average number of minutes that they each spent on homework each night.

Minutes per Night					
62	53	46	66	38	45
52	46	73	39	42	56
64	54	48	59	70	60
49	54	48	57	70	33

- Use a graphing calculator to create a box-and-whisker plot. Describe the shape of the distribution.
- Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.



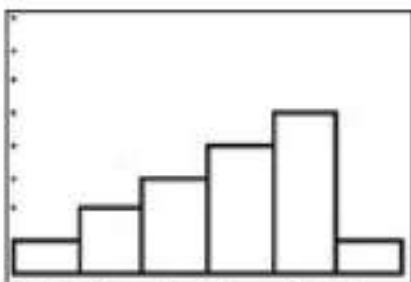
[30, 75] scl: 5 by [0, 5] scl: 1

Example 3

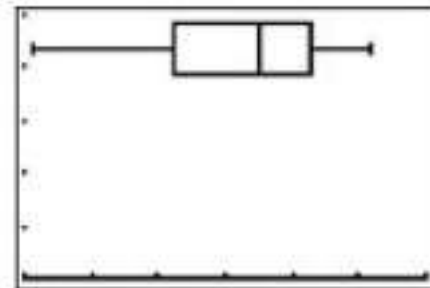
The weekly total points of Kevin's fantasy football team are shown. Both a histogram and a box-and-whisker plot are given.

Total Points							
165	140	88	158	101	137	112	127
53	151	120	156	142	179	162	79

- Describe the shape of the distribution.
- Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.



[50, 200] scl: 25 by [0, 8] scl: 1



[50, 200] scl: 25 by [0, 5] scl: 1