**Section 2.1 – Describing Location in a Distribution**

**1. Measuring Position: Percentiles**

**Definition**: The ***pth percentile*** of a distribution is the value with

**Example**: The stemplot below shows the number of wins for each of the 30 Major League Baseball teams in 2009.

5 | 9  
 6 | 2455  
 7 | 00455589  
 8 | 0345667778  
 9 | 123557  
 10| 3

Key: 5 | 9 represents a team with 59 wins.

Find the percentiles for the following teams: (a) The Colorado Rockies, who won 92 games; (b) The New York Yankees, who won 103 games; (c) the Kansas City Royals and the Cleveland Indians, who both won 65 games.

Note: some people define the *pth percentile* of a distribution as the value with *p* percent *less than or equal* to it. In this case it is possible for an individual to be at the 100th percentile.

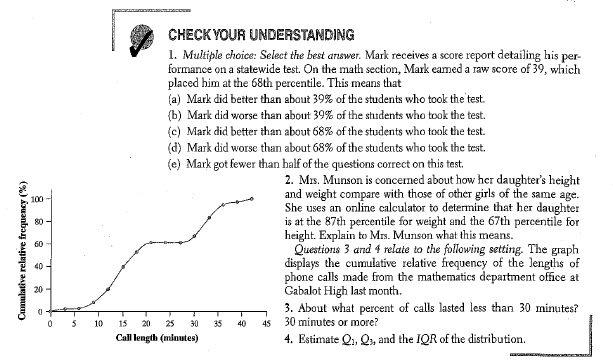
**2. Cumulative Relative Frequency Graphs**

When you are given a *frequency table* for a quantitative variable, it is possible to graphs that depict the *percentiles*. The table gives the inauguration ages of the first 44 US Presidents.

Age Frequency  
 40-44 2  
 45-49 7  
 50-54 13  
 55-59 12  
 60-64 7  
 65-69 3

**Interpreting Cumulative Relative Frequency graphs**

|  |  |
| --- | --- |
|  | (a) Was Barack Obama, at 47, unusually young?  (b) Estimate and interpret the 65th percentile of the distribution. |



**3. Measuring Position: Z-Scores**

Another way of *measuring position* is to determine how many *standard deviations* above or below the mean an individual data point is. This is called computing a ***z-score***. This process is known as ***standardizing*.**

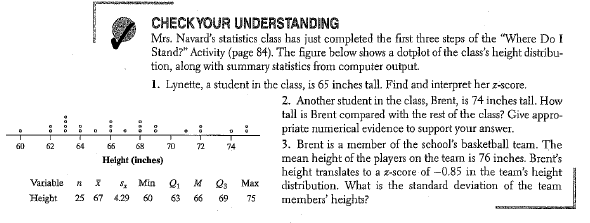
**Definition** - S**tandardized value (z-score)**:  
If x is an observation from a distribution that has a known mean and standard deviation, the **standardized value** of x is

This measure tells how many standard deviations the given data point is from the mean.

**Example**: 2009 MLB Wins (revisited)

|  |  |
| --- | --- |
| 5 | 9  6 | 2455  7 | 00455589  8 | 0345667778   9 | 123557  10| 3  Key: 5 | 9 represents a team with 59 wins. | Mean: 81 Median: 83.5  StDev: 11.43  Minimum: 59  Maximum: 103  Q1: 74  Q3: 88 |

Use the information provided to find the standardized scores for the (a) Boston Red Sox with 95 wins; (b) Atlanta Braves with 86 wins; and (c) Washington Nationals with 59 wins.



Homework: pp 100-101, 5-15 odd