**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| 3Key: 5 | 9 represents a team with 59 wins. | Mean: 81Median: 83.5StDev: 11.43Minimum: 59Maximum: 103Q1: 74Q3: 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