

# Measures of Relative Standing (Position)

## Section 2-6

# Measures of Relative Standing (Position)

## ❖ **z Score** (or standard score)

the number of standard deviations  
that a given value  $x$  is above or below  
the mean

# Measures of Position z score

**Sample**

$$z = \frac{x - \bar{x}}{s}$$

# Measures of Position z score

**Sample**

$$z = \frac{x - \bar{x}}{s}$$

**Population**

$$z = \frac{x - \mu}{\sigma}$$

## Measures of Position z score

Sample

Population

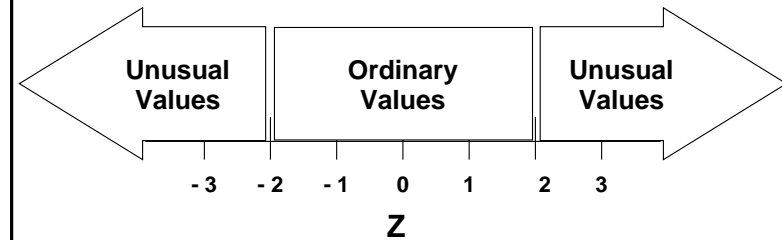
$$z = \frac{x - \bar{x}}{s}$$

$$z = \frac{x - \mu}{\sigma}$$

Round to 2 decimal places

FIGURE 2-14

## Interpreting Z Scores



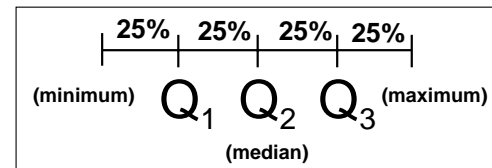
## Other Measures of Position

**Quartiles**  
**Percentiles**

## Quartiles

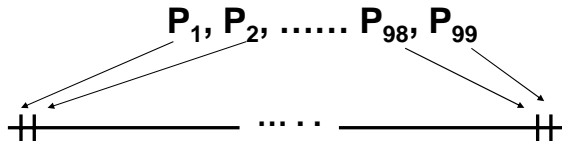
$Q_1, Q_2, Q_3$

divides ranked scores into four equal parts



# Percentiles

## 99 Percentiles



## Finding the Percentile of a Given Score

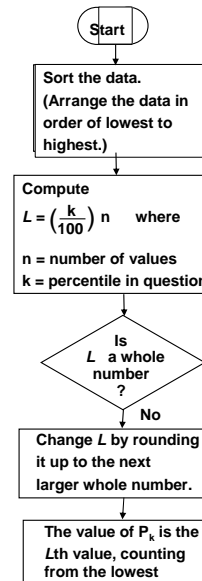
$$\text{Percentile of score } x = \frac{\text{number of scores less than } x}{\text{total number of scores}} \cdot 100$$

## Finding the Score Given a Percentile

$$L = \frac{k}{100} \cdot n$$

- $n$  total number of values in the data set
- $k$  percentile being used
- $L$  locator that gives the *position* of a value
- $P_k$   $k$ th percentile

## Finding the Value of the $k$ th Percentile



The value of the  $k$ th percentile is midway between the  $L$ th value and the next value in the sorted set of data. Find  $P_k$  by adding the  $L$ th value and the next value and dividing the total by 2.

Figure 2-15

## Quartiles

$$Q_1 = P_{25}$$

$$Q_2 = P_{50}$$

$$Q_3 = P_{75}$$