Sec 1.1

# Variables

- Characteristic of an "individual"
- Something which varies

# Types of Variables / Graphs

## Qualitative / Categorical Variables

- No Average
- Distributions Shown
    - Bar Graphs (P. 9)
    - Pie Charts (P. 9)

# Quantitative Variables

- Numbers with average
- Distributions shown using
  - Dotplots (P. 11)
  - Stemplots (P. 18)
  - Histograms (P. 26)
  - Ogives (P. 30)
  - Time Plots (P. 32)


Shape (Symmetric / Skewed)
Center (Median)
Spread (Range)
Outliers (Judgement)

# Making Graphs

- Label / Scale Axis ... Take Note
- Title

# Stemplot (Stem/Leaf Plot)

5|4 means 54%

Test Scores:

| | |
|---|---|
| 90 | 87 |
| 80 | 62 |
| 96 | 65 |
| 54 | 85 |
| 80 | 92 |
| 95 | 87 |
| 100 | 74 |
| 75 | 89 |

Stem ↑ ↑ Leaf

| | |
|---|---|
| 5 | 4 |
| 6 | 2 5 |
| 7 | 5 4 |
| 8 | 0 0 7 5 7 9 |
| 9 | 0 6 5 2 |
| 10 | 0 |

| | |
|---|---|
| 5 | 4 |
| 6 | 2 5 |
| 7 | 4 5 |
| 8 | 0 0 5 7 7 9 |
| 9 | 0 2 5 6 |
| 10 | 0 |

86

# Histogram (P. 23, Ex 1.12)

STAT → ENTER → Data in $L_1$

STAT PLOT → Turn On? →  → $L_1$ → ZOOM → 9

2nd Y=

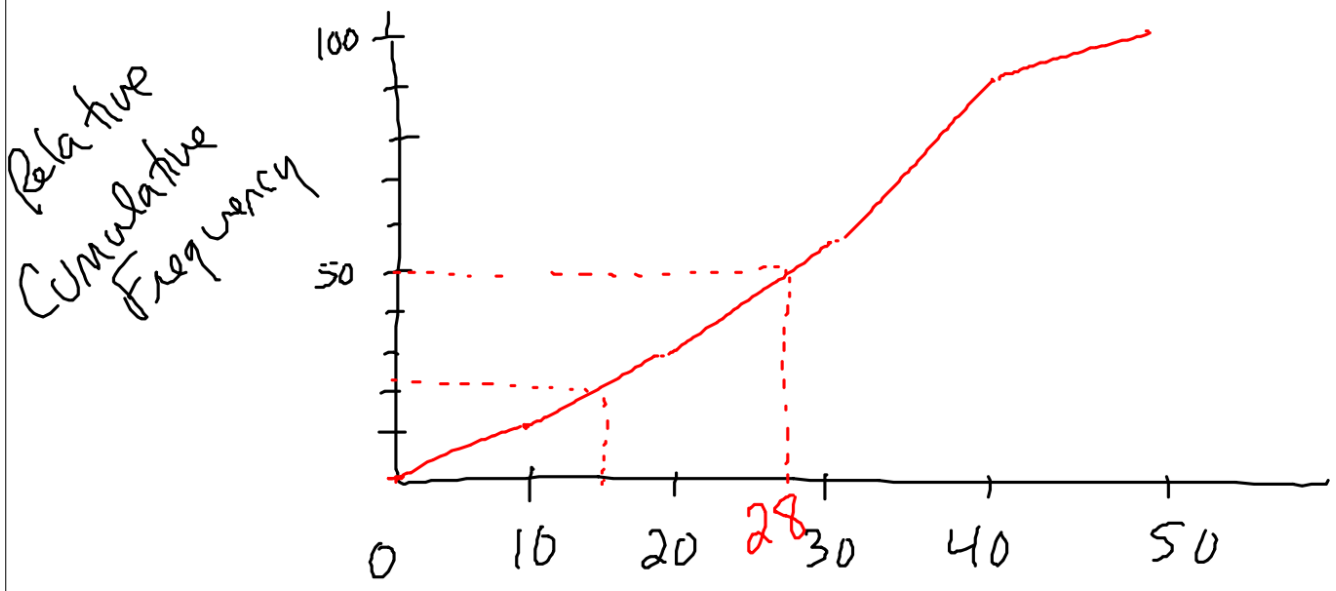
2nd 1

2

6

# Ogives (Relative Cumulative Frequency Plot)

| Test Score | Frequency | Relative Freq | Rel Cumulative Freq |
|---|---|---|---|
| 0 - 9 | 4 | 10% | 10% |
| 10 - 19 | 8 | 20% | 30% |
| 20 - 29 | 10 | 25% | 55% |
| 30 - 39 | 15 | 37.5% | 92.5% |
| 40 - 50 | 3 | 7.5% | 100% |
| | 40 | 100% | |


Relative Cumulative Frequency
100
50
0
10
20
28
30
40
50

# Sec 1.2

Center

Mean ($\bar{x}$)

- Arithmetic average
- NOT resistant > affected by outliers!

Ex 2, 4, 6 $\bar{x} = 4$, $M = 4$

2, 4, 20 $\bar{x} = 8\frac{2}{3}$ $M = 4$

Median (M)

- Midpoint of values
- VERY resistant

Ex 2, 4, 6 ($M = 4$)

2, 4, 6, 8 ($M = 5$)

Mode

- Most frequent

Spread  vs

Range (max − min)

Variance ($s^2$)

← deviation about the mean

$$s^2 = \frac{(x_1-\bar{x})^2 + (x_2-\bar{x})^2 + \cdots + (x_n-\bar{x})^2}{n-1}$$

Standard Deviation ($s$)

$s = \sqrt{\text{variance}}$ → Increases as spread increases

- NOT resistant

# Interquartile Range (IQR)

- Middle 50% ($Q_3 - Q_1$)

# Misc Rules

| Data Set | $\bar{x}$ | | $s$ | |
|---|---|---|---|---|
| $\{2, 4, 6\}$ | 4 | | 2 | |
| $+3$ $\{5, 7, 9\}$ | 7 | $+3$ | 2 | NC |
| $\times 4$ $\{8, 16, 24\}$ | 16 | $\times 4$ | 8 | $\times 4$ |

# 5-Number Summary +2

16 19 24 25 | 25 33 33 34 | 34 37 37 40 | 42 46 49 73

min = 16 ; $Q_1$ = 25 ; M = 34 ; $Q_3$ = 41 ; max = 73

STAT → CALC → 1:1-Var Stats → ENTER → List → ENTER

# Boxplot

## Regular


×

## Modified


×

# Side By Side Boxplots

$L_1 \rightarrow$ Math SAT $(\bar{x} = 559,\ s = 142)$

$L_2 \rightarrow$ Verbal SAT $(\bar{x} = 566,\ s = 128)$