

See Power Point

§2.3 Graphs of Data

Ex Test Data

77, 83, 92, 54, 57, 66, 62, 65, 65

a) Make a Stem & Leaf Plot

Tens	ones
5	4 7
6	6 2 5 5
7	7
8	3
9	2

on a computer

2 5 5 6

b) Frequency Polygon → Plot Pts (MidPt, freq)
Connect Dots

Scores	freq	MidPt	Cum freq
50-59	2	54.5	2
60-69	4	64.5	6
70-79	1	74.5	7
80-89	1	84.5	8
90-99	1	94.5	9

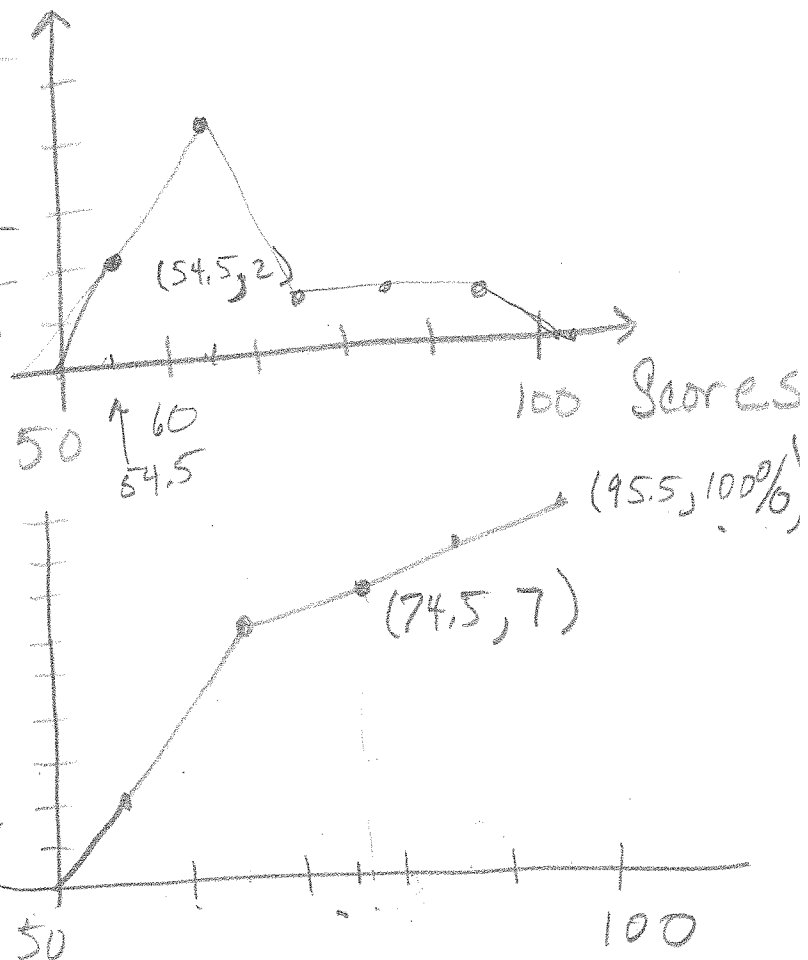
$$\text{Midpt} = \frac{50 + 59}{2} = 54.5$$

$$\text{Width} = 60 - 50 = 10$$

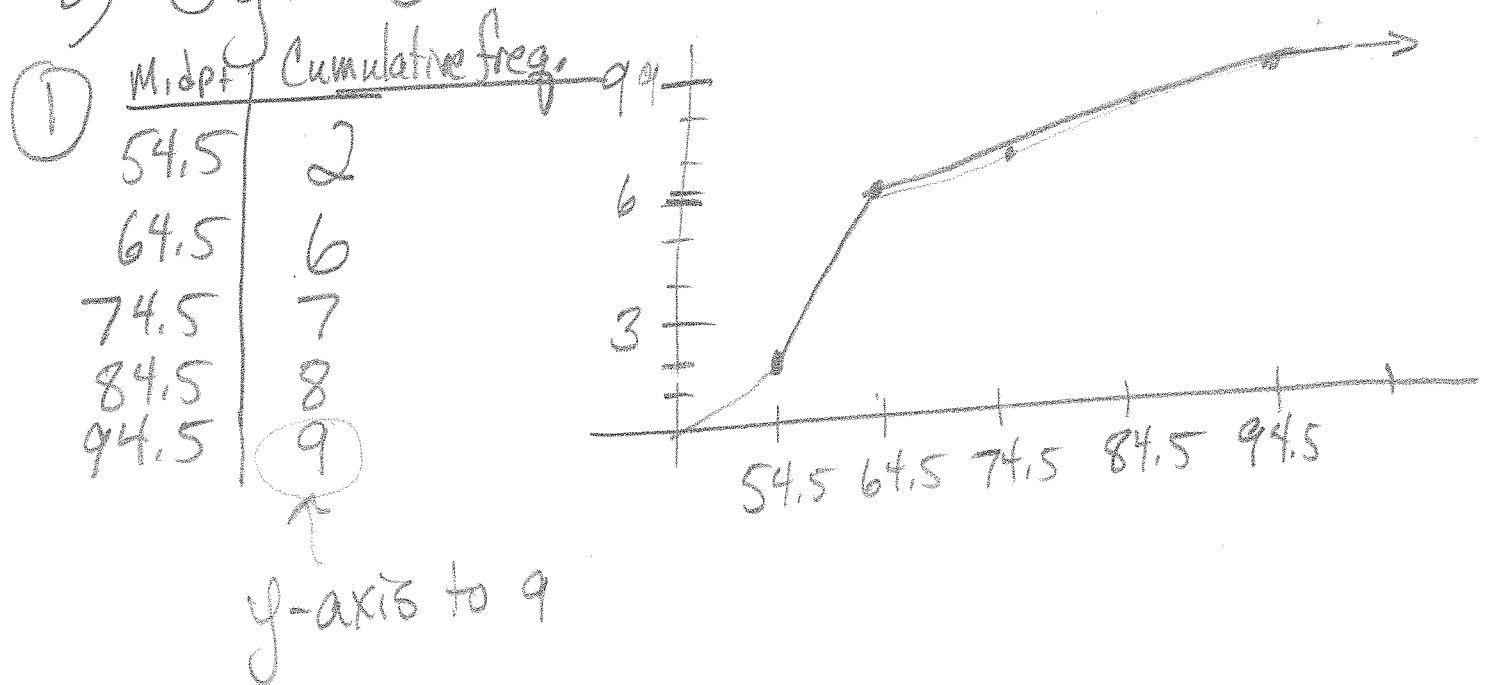
c) OGive

(Midpt, Cum. freq.)

$$\text{Rel freq} = \text{prop} = \frac{8}{9} = \frac{x}{n}$$

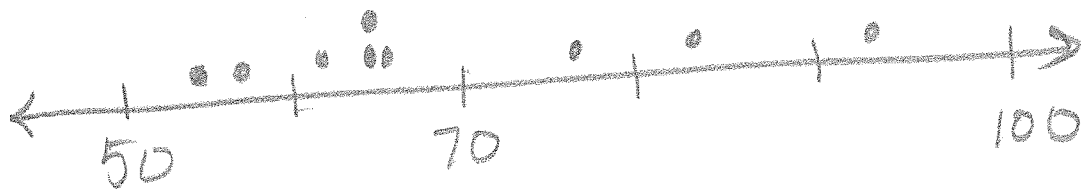


3) Ogive (2) Plot (Midpt., Cum. freq.)



4) Dot Plot

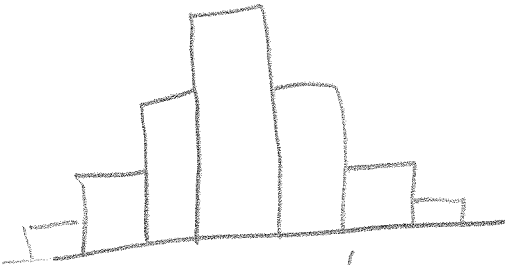
- ① Draw a Number line
- ② Stack a dot for each data value



Types of Distributions

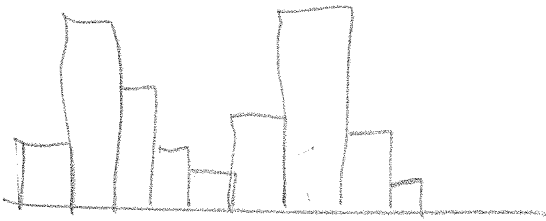
Given by shape of the graph

Normal



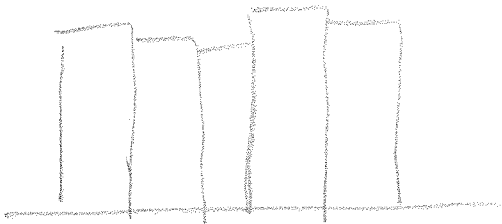
- Describe in words
 - Start & end low
 - One Max in Middle
 - Symmetric
- (Close is good!)

Bimodal



Two distinct groups
Represented by data
More than one Max

Uniform

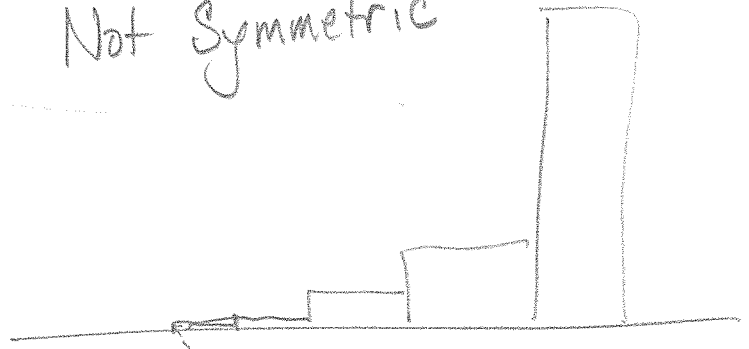


Each outcome is
equally likely
Does Not start & end low

Skewed Right

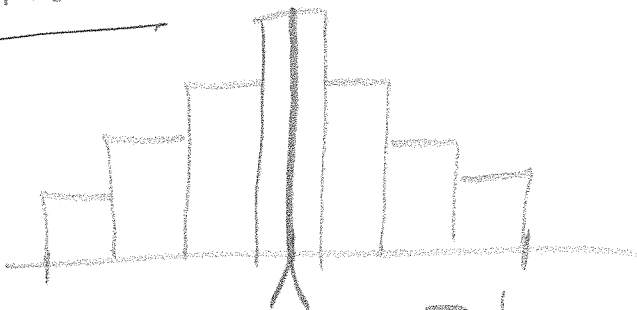


Skewed Left
Not Symmetric



Histogram

Normal



Mean = Balance Pt

Median = Equal Area

Mode = high Point

Midrange = pt in Middle of range

Skewed



§3.1 Measures of Center

Quantitative Data $\rightarrow$ Test Scores

Median $n =$ Middle Data Value $X_{\frac{n+1}{2}}$ n odd
Average of two middle data values

$$\star \text{ Mean} = \bar{X} = \frac{\sum X}{n} = \frac{\sum_{i=1}^n X_i}{n} =$$

Mode = most common Data Value
No Repeats = DNE

$$\text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \text{Average of Max and Min}$$

Find Median of Test scores

Ex a) Put Data in Order *

10 54 57 62 65 65 66 77 83 92
 x_1 x_5 x_9

$n=9 = \# \text{ data values}$

med =

$$\frac{n+1}{2} = \frac{10}{2} = 5 \quad x_5 = \text{Middle} = \boxed{65} = \text{Med.}$$

$$b) \text{ Mean} = \bar{x} = \frac{\sum x_i}{n} = \frac{54 + 57 + \dots + 92}{9} = 69$$

$$\boxed{\bar{x} = 69}$$

$$c) \text{ Mode} = \boxed{65}$$

$$d) \text{ Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{92 + 54}{2} = \boxed{73}$$

Question If a 10th student got a 10 on the Test, How does this change the Mean & Median? Which is affected Most?

$$\bar{x} = \frac{10 + 54 + \dots + 92}{10} = 63.1 \quad \text{Med.} = \frac{65 + 65}{2} = 65$$

Median is Not affected but the Mean is decreased significantly.

Homework

Two things

① Give All 4 measures of Center

$\left. \begin{array}{l} \text{Test} \\ \text{Data} \end{array} \right\} \begin{array}{l} \text{Mean} = \bar{X} = 69 \\ \text{Median} = 65 \\ \text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{92 + 54}{2} = \frac{146}{2} = 73 \\ \text{Mode} = \text{most common data value} = 65 \end{array}$

② Answer the Question

How are the mean and Median effected if an additional Student Scored 10 on test?

$$\bar{X} = 63.1$$

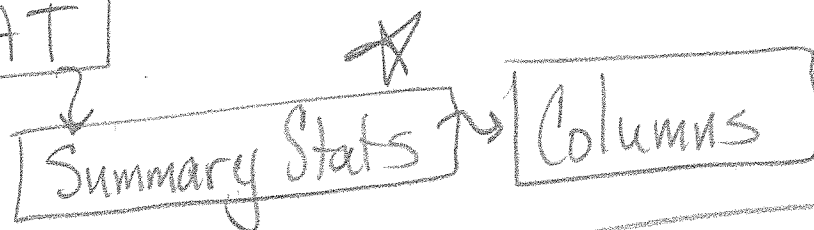
$$\text{Med} = 65$$

The score of 10 decreases the mean by 6 pts, A lot, but doesn't change median at all.

Computer with Stat Crunch

Data Sets with Book

STAT



Select Data → Burge King Dinner
McD Dinner

a) Compute

	BK	McD
Mean	153.3	179.32
Median	143	172
Min	54	64
Max	293	352
Midrange	173.5	208
Mode	126	177 & 156

↑
Bimodal

b) Compare the Centers

BK has faster Service
on average than McD.
All measures are lower,
of center

On Calculator

On Calculator

[Stat]

[Edit]

Put Data in a List

[Quit]

[Stat]

▷

[CALC]

1: 1-Var Stats

List : L1

Freq :

← Blank

[Calculate] enter

$$\bar{X} = 66.875$$

Use **1-VarStats** on calculator to find measures of center.

Stat **Edit** → Put data into a list
Quit
Stat **▶** **CALC** 1: 1-VarStat

List: L1

freqList: _____

← Empty **Clear**

$$\bar{x} = 67.36$$

$$\min x = 60$$

$$Q_1 = 64$$

$$\text{Med} = 66$$

$$Q_3 = 72$$

$$\max x = 81$$

$$\text{Mean} = \bar{x} = 67.36$$

$$\text{Median} = 66$$

$$\text{Mode} = 64$$

← Find most common in list

$$\text{Midrange} = \frac{81 + 60}{2} = \frac{141}{2} = 70.5$$

$$= \frac{\max x + \min x}{2}$$

Plug in

How does $x = 81$ effect the measures of center

$\bar{x} = 66.9$ ← Mean drops by almost an inch
 Med = 64 but median doesn't change.

5 Number Summary

Use Summary Statistics on StatCrunch
to find centers

	Summary Statistics	Columns	
	$\bar{X}$	Median	XMin XMax
Pre	6.19	6.19435	6.0002 6.3669
Post	5.64	5.63615	5.5361 5.7790
	↑ Too few	↑ One More Better	↑ Same OK

Pre 1964 Quarters weigh more than
Post 1964 Quarters.

Service Times

McD	68	72	100	97	124	72	96
Burger King	100	120	110	140	150	170	120

TI-83 or 84

STAT EDIT
STAT Calc

enter Data
1-VarStats

McD	$\bar{x} = 89.9$	median = 96	mode = 72	Midrange = $\frac{\text{Max} + \text{Min}}{2}$
BK	$\bar{x} = 130$	Median = 120		= 96 = $\frac{124 + 68}{2}$

Computer with StatCrunch Summary Stats

Stat
Summary Stats Columns

Select Data

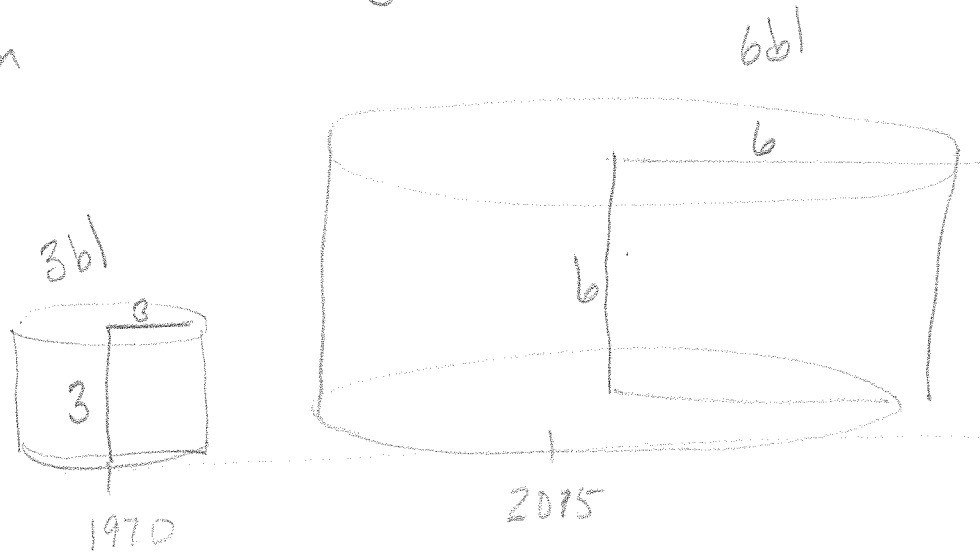
Compute!

Conclusion

McD is Faster than BK

§ 2.3 Missleading Graphs

Pictographs that change in more than one direction



Vol is Not 2 times

