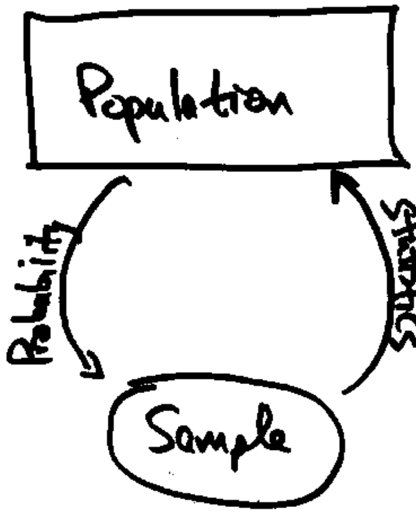
451

1

4-3



55	71
75	79
23	85
66	
65	
66	

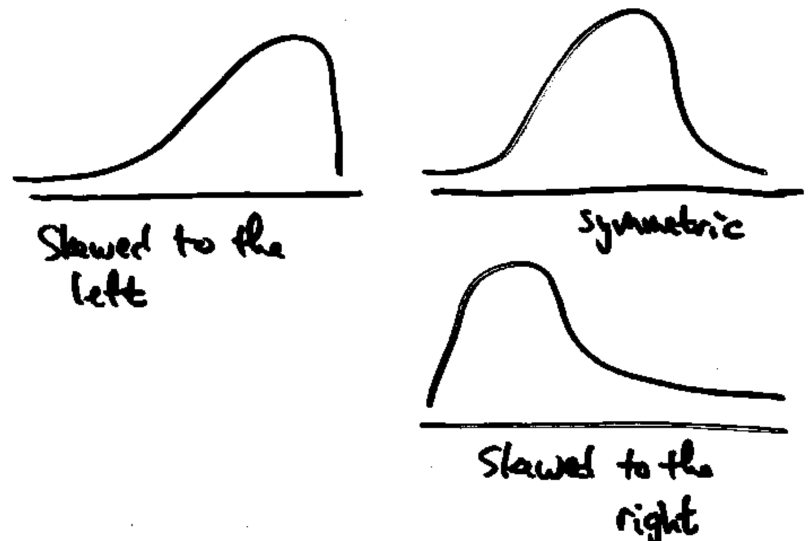
Stem-and-leaf plot

2	3
3	
4	
5	5
6	656
7	51 9
8	5

2	3
3	
4	
5	5
6	566
7	159
8	5

2

Shapes



Skewness = direction of the longer tail

Summary table $n=9$

Class	Midpt	Freq.	Rel. Freq.
20-29	24.5	1	.111
30-39	34.5	0	0
40-49	44.5	0	0
50-59	54.5	1	.111
60-69	64.5	3	.333
70-79	74.5	3	.333
80-89	84.5	1	.111

(3)

Measures of location

Sample mean $= \bar{x} = \dfrac{\sum x_i}{n}$

$= 65$

Sample median $= Q_2 =$ "middle value"

$$= \begin{cases} \left(\frac{n+1}{2}\right)^{st} \text{ value} & \text{if } n \text{ is odd} \\ \left(\frac{n}{2}\right)^{th}, \left(\frac{n}{2}+1\right)^{th} \text{ averaged} & \text{if } n \text{ is even} \end{cases}$$

$Q_2 = 66$

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mode = most frequent value

$= 66$

(4)

midrange = average of largest & smallest values

$= \dfrac{85+23}{2} = 54$

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trimmed mean:

trim a fixed percentage of the data values from each end & average the remaining values

10% trimmed mean: 10% of 9 $\approx$ 1

So trim 1 value from each end & average the remaining 7: 68.14

Quartiles

break the data set into 4 equal parts

These are special cases of percentiles

45th percentile is the place such that 45% of the observations fall below it.

Measures of variability (or dispersion)

Range = max − min

Sample variance $= s^2 = \dfrac{\sum (x_i - \bar{x})^2}{n-1}$

Sample standard deviation $= s = \sqrt{s^2}$

mean absolute deviation = MAD

$$= \frac{\sum |x_i - \bar{x}|}{n}$$

Alternate formula for s^2

$$s^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}$$

$$= \frac{\sum_{i=1}^{n} (x_i^2 + \bar{x}^2 - 2x_i\bar{x})}{n-1}$$

$$= \frac{\sum_{i=1}^{n} x_i^2 + \sum_{i=1}^{n} \bar{x}^2 - 2\sum_{i=1}^{n} x_i\bar{x}}{n-1}$$

$$= \frac{\sum_{i=1}^{n} x_i^2 + n\bar{x}^2 - 2\bar{x}\left(\sum_{i=1}^{n} x_i\right)}{n-1}$$

But $\sum_{i=1}^{n} x_i = n\bar{x}$

$$s^2 = \frac{\sum x_i^2 - n\bar{x}^2}{n-1}$$

$$s^2 = \frac{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}{n-1}$$

Skewness, Kurtosis

Skewness ↑ based on $\sum (x_i - \bar{x})^3$

Kurtosis ↑ based on $\sum (x_i - \bar{x})^4$

HW #1 due 4-10-07

p. 13 #2

p. 17 #8

p. 28 #18