Panel 1

Last Time:

Variance: $\frac{1}{n-1}\sum (x-\bar{x})^2 = \frac{1}{n-1}\left(\sum x^2 - \frac{(\sum x)^2}{n}\right)$ $\left\{ \begin{array}{l} = s^2 \\ = \sigma^2 \end{array} \right.$

Std. Dev: $s = \sqrt{s^2}$ $\sigma = \sqrt{\sigma^2}$

Quartiles Q_1 and Q_3

0. Sort data.
1. Compute $L_1 = 0.25 \cdot N = \frac{1}{4} \cdot N$ and $L_3 = 0.75 \cdot N = \frac{3}{4} \cdot N$
2. If L_1, L_3 are not whole, take the following #.
   Else take the avg of that # and the next.

1

Panel 2

2

Panel 3

Name:

Quiz 3

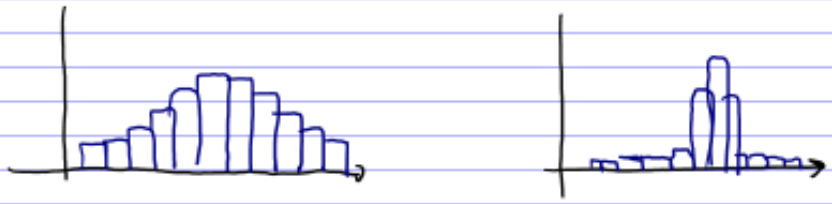
(1) Suppose some random sample shows the following values:
3, 5, 1, 4, 2, 6 Compute the sample variance s^2.

(2) If for some data the variance turned out to be 11.56 what is the standard deviation?

3

Panel 4

(3) Which distribution has the bigger standard deviation?



(4) Find Q_1 and Q_3 for the data: 3, 11, 9, 5, 5, 2, 6, 8, 10, 1, 3, 4, 6

4

Panel 5

Percentile: x^{th} percentile is that # s.t. $x\%$ are less and $(100-x)\%$ are bigger.

Ex: 95th percentile in SAT scores: 95% are worse, 5% are better.

To do: (1) Sort data (2) $C = x \cdot N$ is position. (round up)
(3) Take the number at that position

Ex: Cotinine level of 11 smokers is as follows:

~~0~~, ~~87~~, ~~103~~, ~~253~~, ~~1~~, ~~103~~, ~~173~~, ~~265~~, ~~1~~, ~~112~~, ~~197~~

Find the 95% percentile.

$0.95 \cdot 11 = 10.45$
pick 11th #

0, 1, 1, 87, 103, 112, 173, 173, 197, 253, 265

5

Panel 6

Box Plot: combines Q_1, Q_3, median, min, max in into one picture.

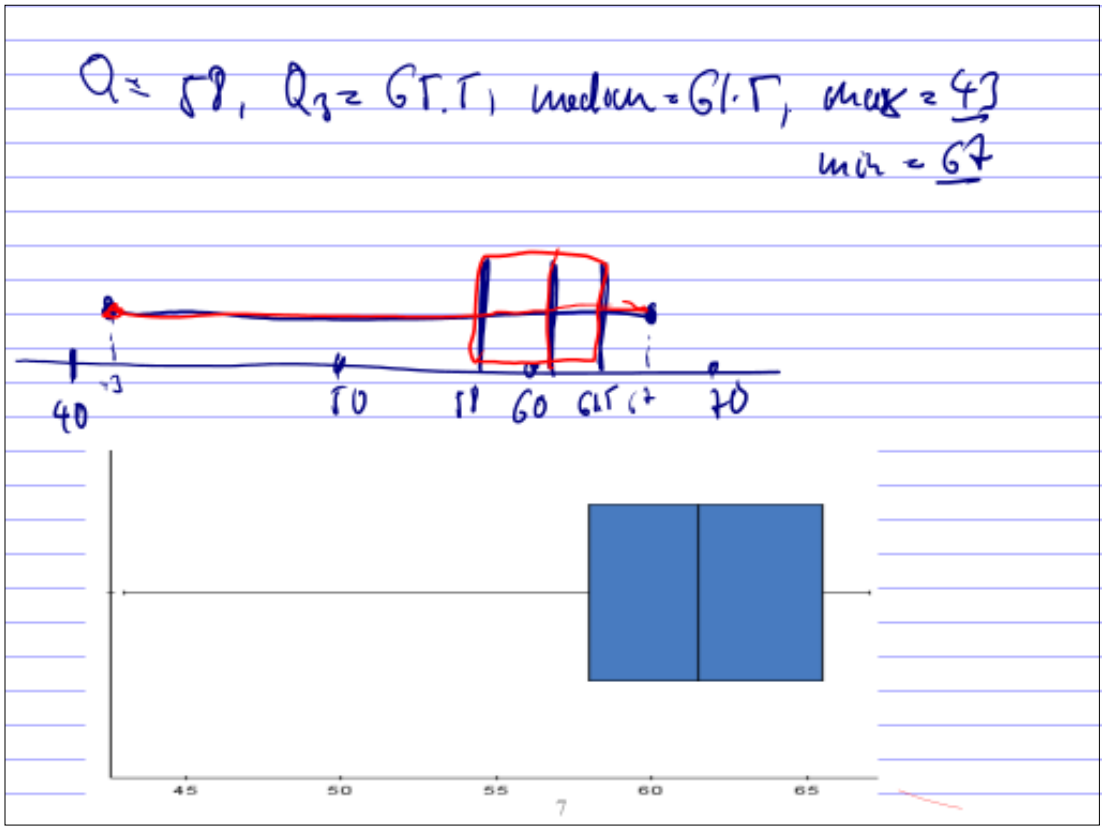
(1) draw horiz. line from min to max
(2) draw vert. lines at Q_1, Q_2, Q_3
(3) Complete the box.

Ex: Draw box plot for the following data:

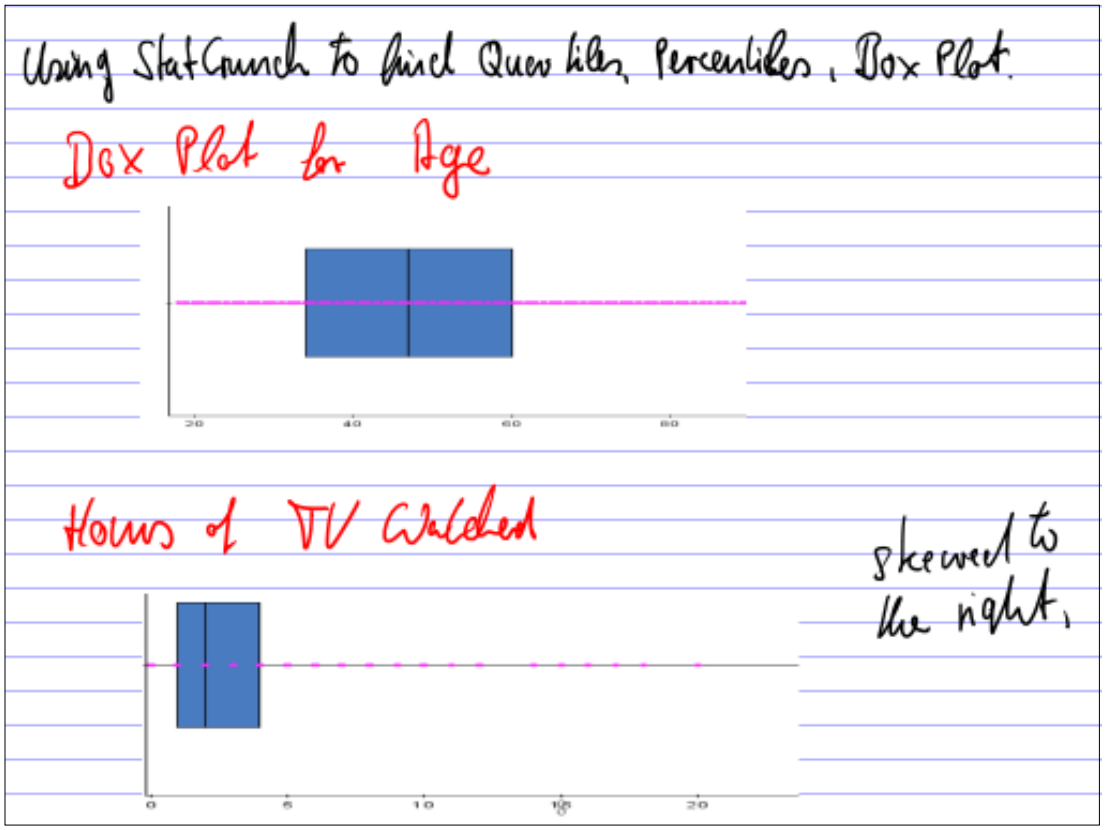
43	51	53	55	57	58	58	59	60	61
61	61	61	61	62	63	64	64	65	65
65	66	66	66	66	66	66	67		

6

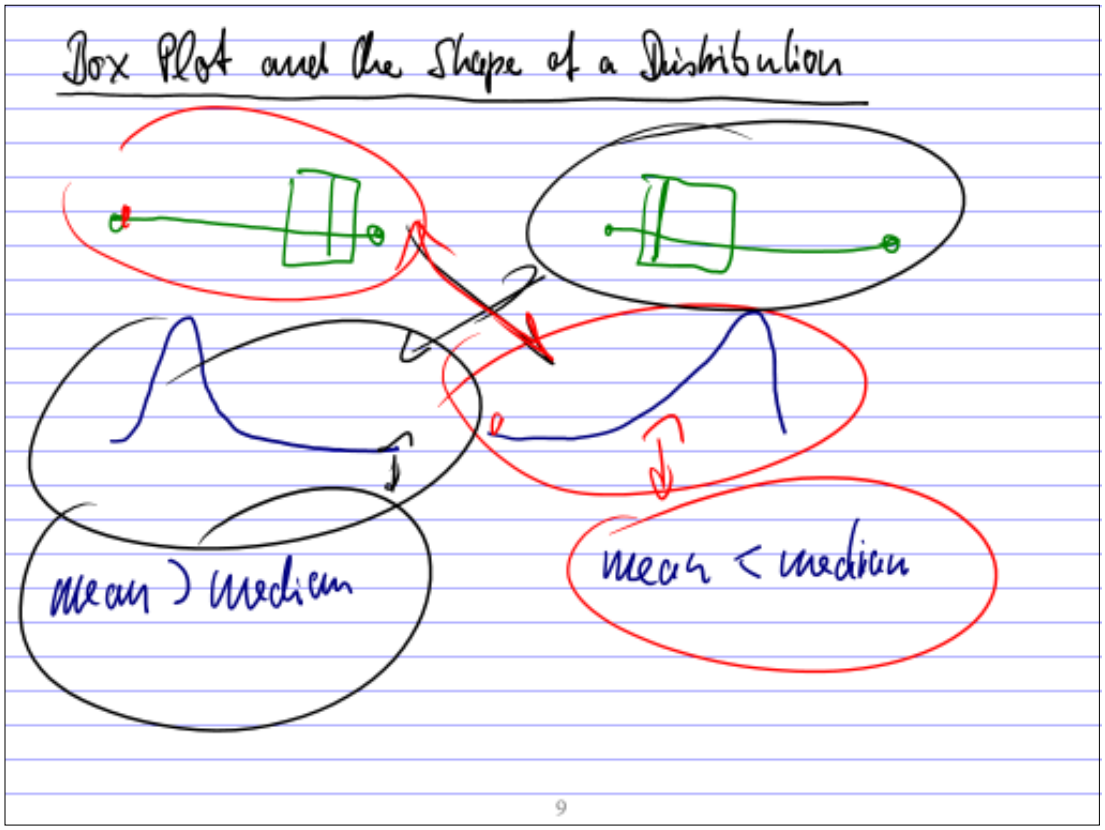
Panel 7



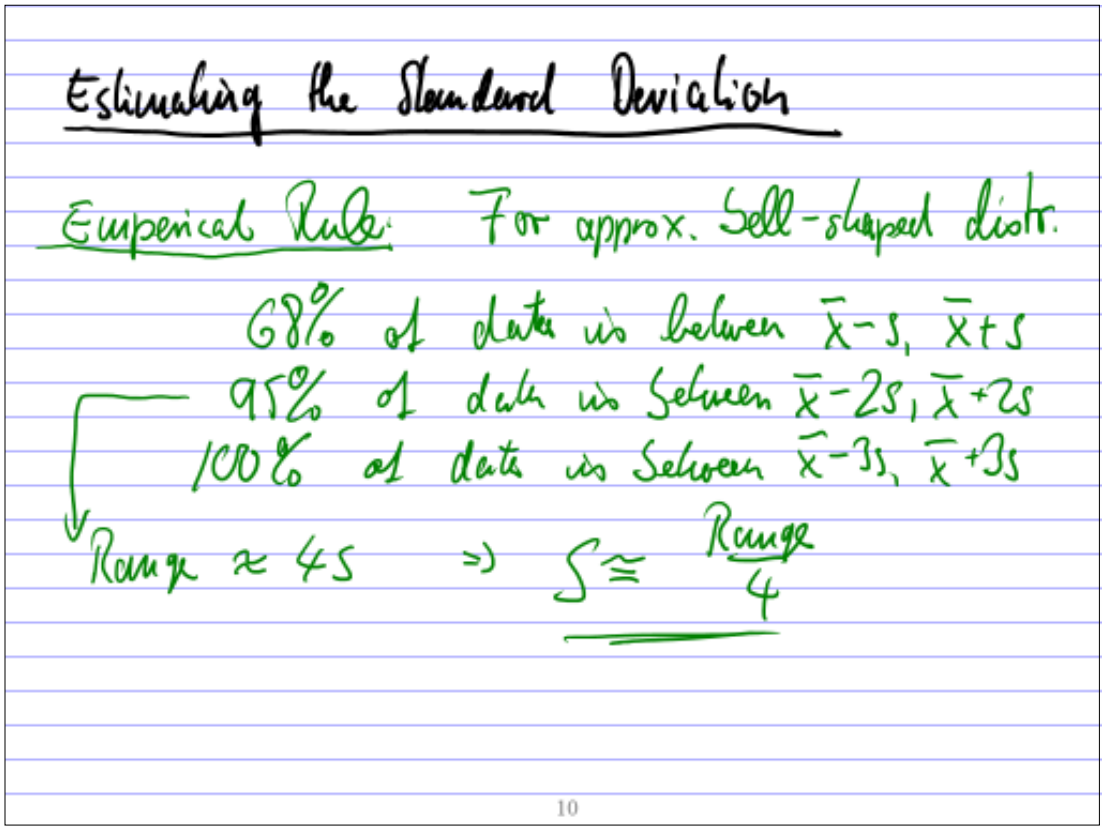
Panel 8



Panel 9



Panel 10



Panel 11

Ex: SAT scores have $\bar{x} = 500$ and $s = 100$

68% of all students scored between $500-100 = 400$ and $500+100 = 600$

95% of all students scored between 300 and 700

100% of all students scored between 200 and 900

11

Panel 12

IQR and Standard Deviation

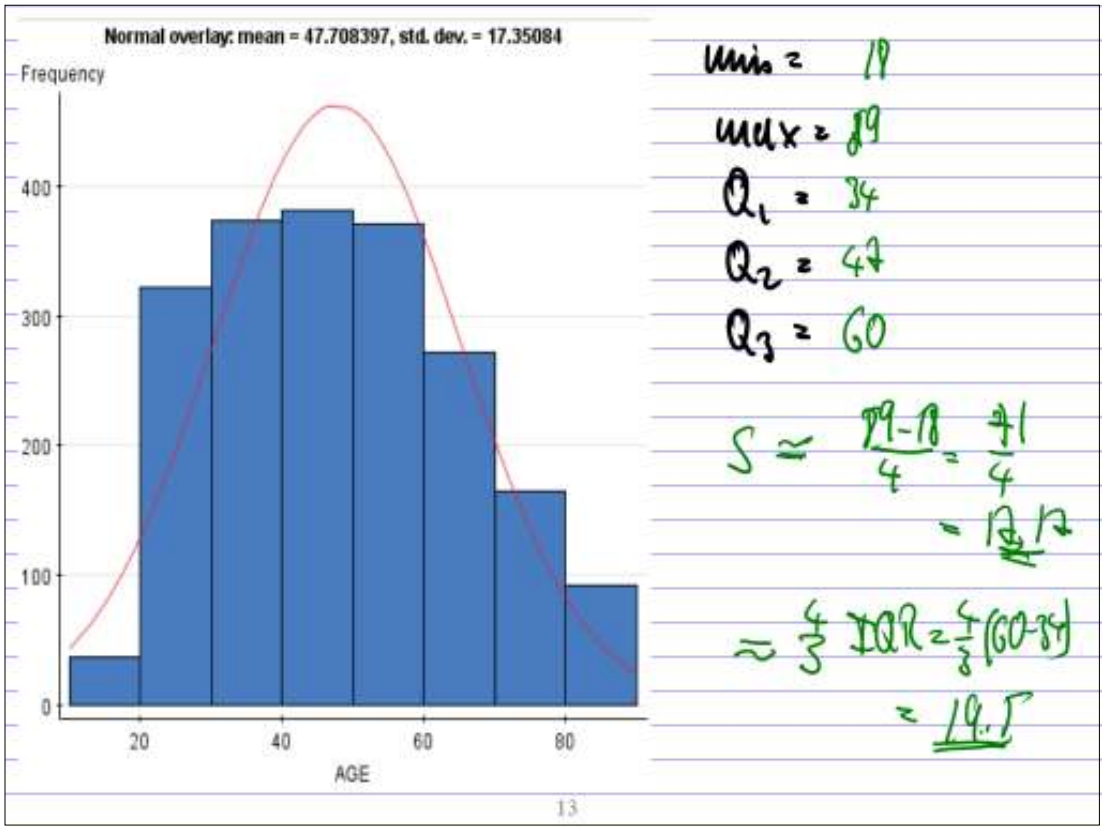
A sometimes better estimation of s uses

IQR = Inter-Quartile-Range $Q_3 - Q_1$

$s \approx \frac{4}{3} \cdot IQR$

12

Panel 13



$\min = 19$

$\max = 89$

$Q_1 = 34$

$Q_2 = 47$

$Q_3 = 60$

$s \approx \frac{89-19}{4} = \frac{71}{4}$

$= 17.75$

$\approx \frac{4}{3} IQR = \frac{4}{3}(60-34)$

$= 14.5$