Worksheet Standard Deviation

X: 60 61 61 62 62 62 62 63 63 64

Mean: 62

Median: 62

$\frac{62+62}{2}$

62

Midrange: $\frac{60+64}{2} = 62$

Mode: 62

$\bar{x} = 62$

x	$x-\bar{x}$	$(x-\bar{x})^2$
60	-2	4
61	-1	1
61	-1	1
62	0	0
62	0	0
62	0	0
62	0	0
63	1	1
63	1	1
64	2	4

$\sum (x-\bar{x})^2 = 12$

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

$$= \frac{12}{9}$$

$$= 1.\overline{3}$$

$$s = \sqrt{1.\overline{33}}$$

$$\approx 1.15$$

x	x^2
60	3600
61	3721
61	3721
62	3844
62	3844
62	3844
62	3844
63	3969
63	3969
64	4096

$\sum (x^2) = 38,452$

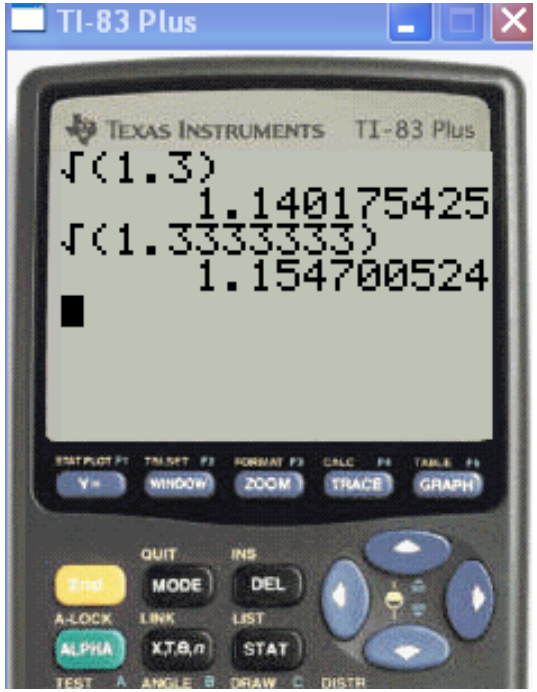
$$s^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}$$

$$= \frac{38452 - \frac{(620)^2}{10}}{9}$$

$$= \frac{38452 - 38440}{9}$$

$$= 1.\overline{33}$$

$$s \approx 1.15$$



Notice - rounding too soon gives much rounding error in answer.

3.45

6 3 7 11 4 3 8 7 2 6 9 15

range $15 - 2 = 13$ range

$\text{mean} = \frac{\sum x}{12} = \frac{81}{12} \approx 6.75$

x	x^2
	36
	9
	49
	121
	16
	9
	64
	49
	4
	36
	81
	225
81	699

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

$$= \frac{699 - \frac{(81)^2}{12}}{11}$$

$$= \frac{699 - \frac{6561}{12}}{11}$$

$$= \frac{699 - 546.75}{11}$$

$$s^2 \approx 13.8409$$

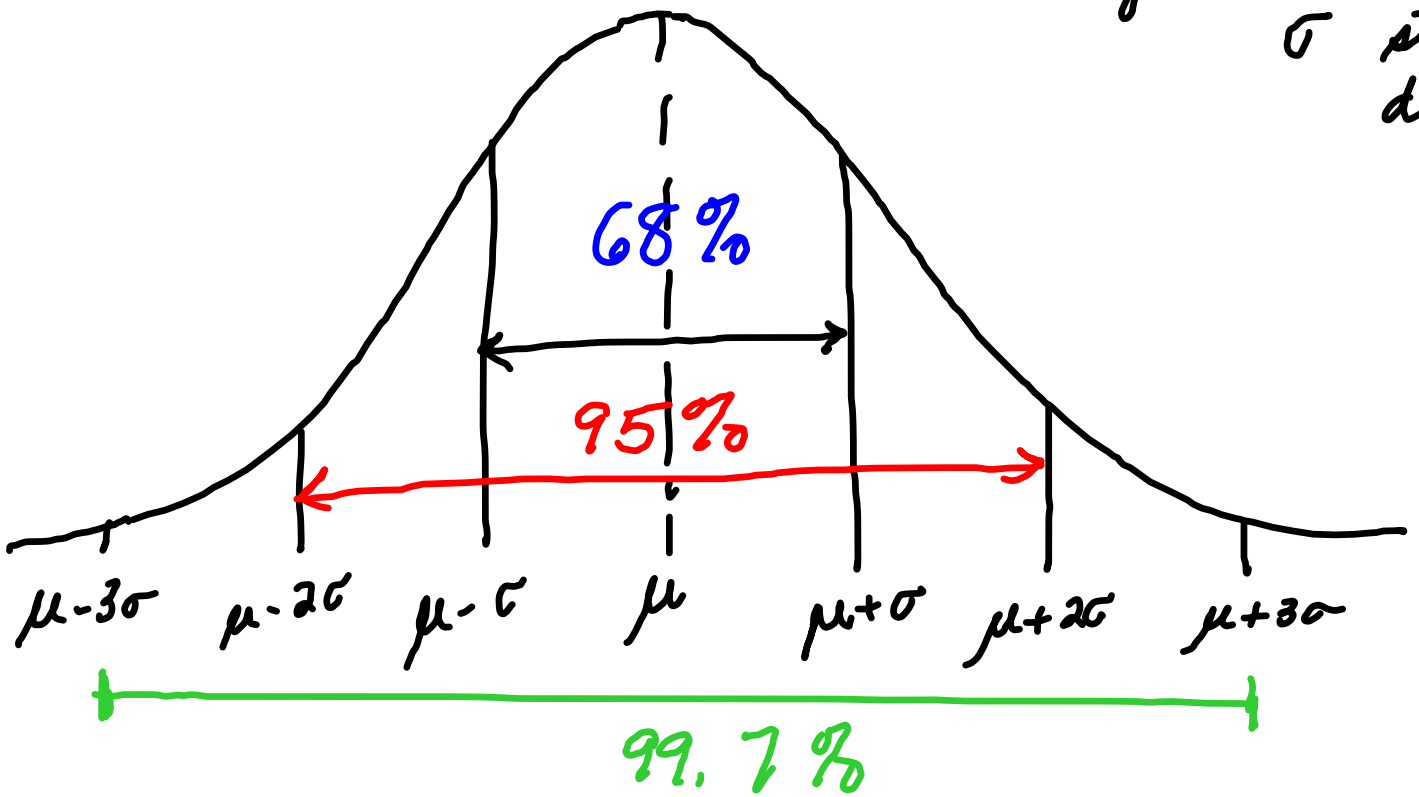
$$s \approx \sqrt{13.8409}$$

$$s \approx 3.72$$

The Empirical Rule

Symmetric

σ standard deviation



3.5 Measures of Position

Where is 60 grams?

Quartiles IQR

Min | 1st Quartile | median 2nd Quartile | 3rd Quartile | Max

Q_1 Q_2 Q_3

IQR - Interquartile Range = $Q_3 - Q_1$

Look at kittens

37 38 40 41 44 45 49 51 52 52 54 56 57 57 58

60 63 63 65 69 72 76 77 84 91

Q_2 $\frac{n+1}{2} = \frac{25+1}{2} = 13$ this is where it is

median Q_2 is actually 57

Q_1 $\frac{12+1}{2} = \frac{13}{2} = 6.5$

$\frac{45+49}{2} = 47$

Q_3 $\frac{65+69}{2} = 67$

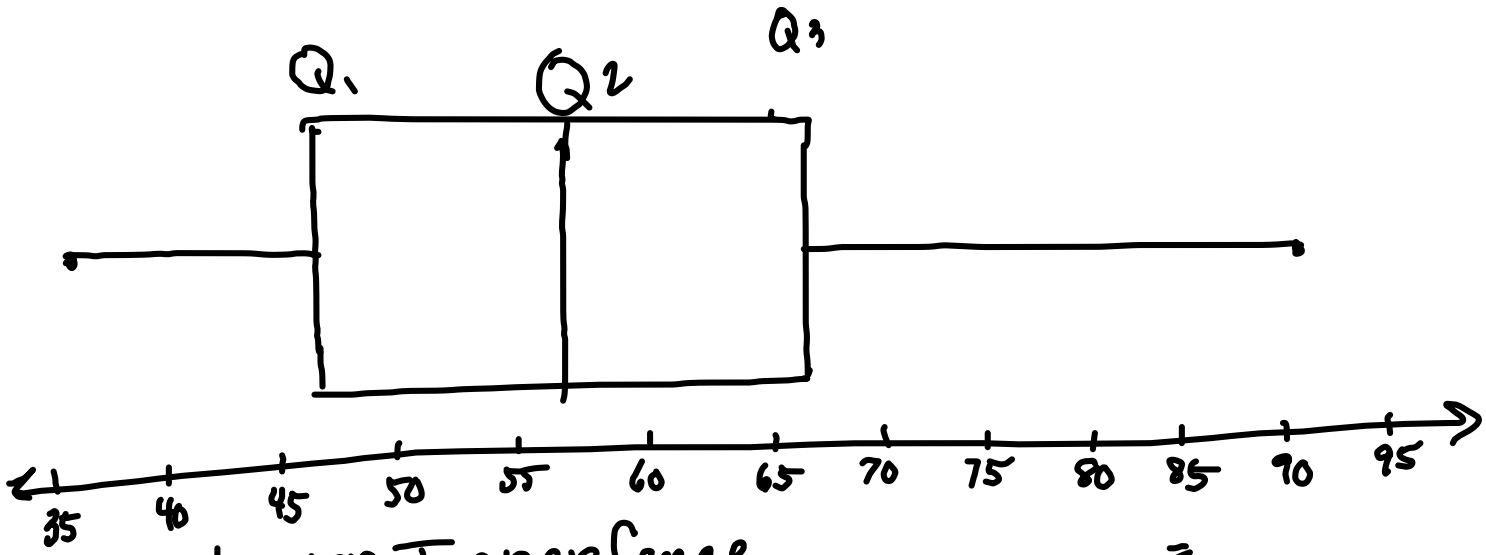
IQR = 67 - 47 = 20

Between 47 and 67 we have 50%

Five number summary

Min	Q_1	Q_2	Q_3	Max
37	47	57	67	91

Box & Whisker Plot



Lower Inner fence =

$f_L = Q_1 - 1.5(IQR) = 17$

$f_U = Q_3 + 1.5(IQR) = 97$

Upper Inner fence

Test

next Tuesday

2/14/2012

Chapters 2 & 3