

# 9.8 Statistics & Data

- Obj: 1. Use measures of center, 5# summary, box plots.  
 2. Find standard dev. & normal distribution.

Statistics: #s associated w/ a data set  
parameter: # used to describe an entire population

mean, median, mode  
 average, middle term (#s in order), most frequent entry

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{12, 14, 10, 1, 9, 13, 17, 14, 16}

Find <sup>counts outliers</sup> mean, <sup>most useful</sup> median, <sup>least useful</sup> mode  
 11.8      13      14

Range: max - min: 17 - 1 = 16

Median: separates data into halves

quartiles: " " " quarters

Q<sub>1</sub>: median of lower half

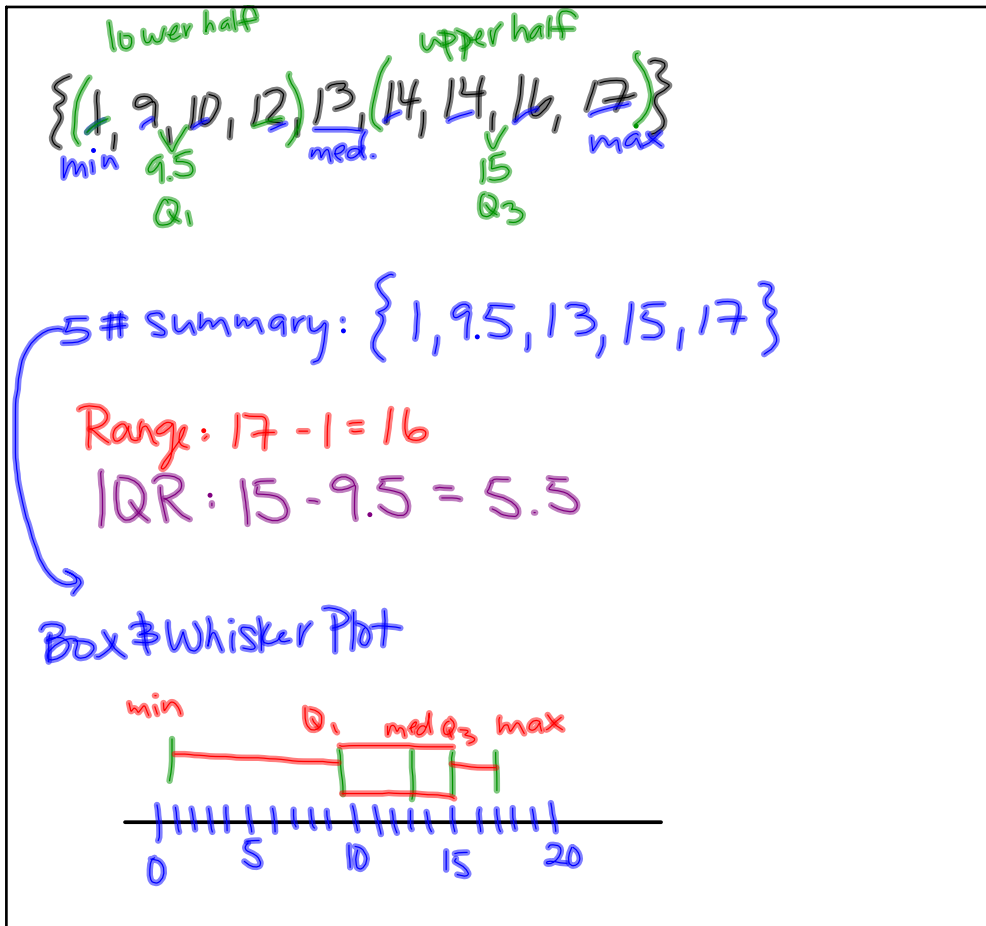
Q<sub>2</sub>: median

Q<sub>3</sub>: median of upper half

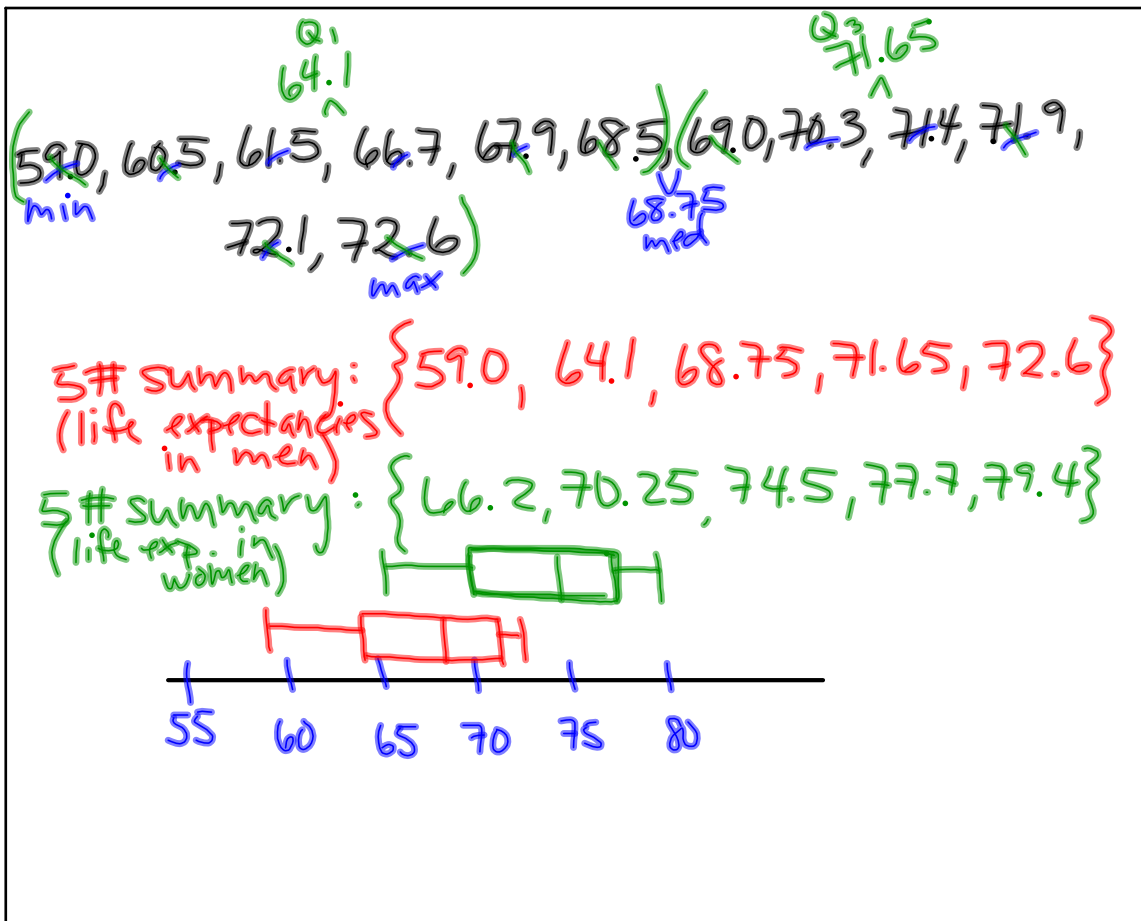
Interquartile Range: IQR: Q<sub>3</sub> - Q<sub>1</sub>

5# summary: {min, Q<sub>1</sub>, med, Q<sub>3</sub>, max}

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## Outlier

a data entry is an outlier if it is more than  $1.5 \times IQR$  below  $Q_1$  or  $1.5 \times IQR$  above  $Q_3$

5# summary:  $\{66.2, 70.25, 74.5, 77.7, 79.4\}$   
 $Q_1$   $Q_3$

$$IQR: 77.7 - 70.25 = 7.45$$

$$1.5 \times IQR = 11.175$$

$$Q_3 + 11.175 = 88.875 \quad \text{no outliers above}$$

$$Q_1 - 11.175 = 59.075 \quad \text{no outliers below}$$

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5# summary:  $\{5, 11, 19.5, 30.5, 61\}$

Identify: is the min/max are outliers?

$$IQR = 30.5 - 11 = 19.5$$

$$1.5 \times 19.5 = 29.25$$

$$Q_3 + 29.25 = 59.75$$

$$Q_1 - 29.25 = -18.25 \quad \text{no lower outliers}$$

61 is outlier

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Standard deviation: measure of variability for normal data.

Variance:  $(\text{standard dev})^2$

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on calc.

$\bar{x}$  = mean: 87.49

Standard dev:  $\sigma = 3.45$

Variance:  $(3.45)^2 = 11.8$

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