Normal Distribution

99.7%

95%

68%

0.15%   2.35%   13.5%   34%   34%   13.5%   2.35%   0.15%

-4σ -3σ -2σ -1σ 0σ 1σ 2σ 3σ 4σ

$\mu-3\sigma$ $\mu-2\sigma$ $\mu-\sigma$ μ $\mu+\sigma$ $\mu+2\sigma$ $\mu+3\sigma$

|-----68%-----|

|-------------95%-------------|

|-----------------99.7%-----------------|

IQR

Q1   Q3

Q1 − 1.5 × IQR   Q3 + 1.5 × IQR

Median

-4σ -3σ -2σ -1σ 0σ 1σ 2σ 3σ 4σ

-2.698σ -0.6745σ 0.6745σ 2.698σ

24.65%   50%   24.65%

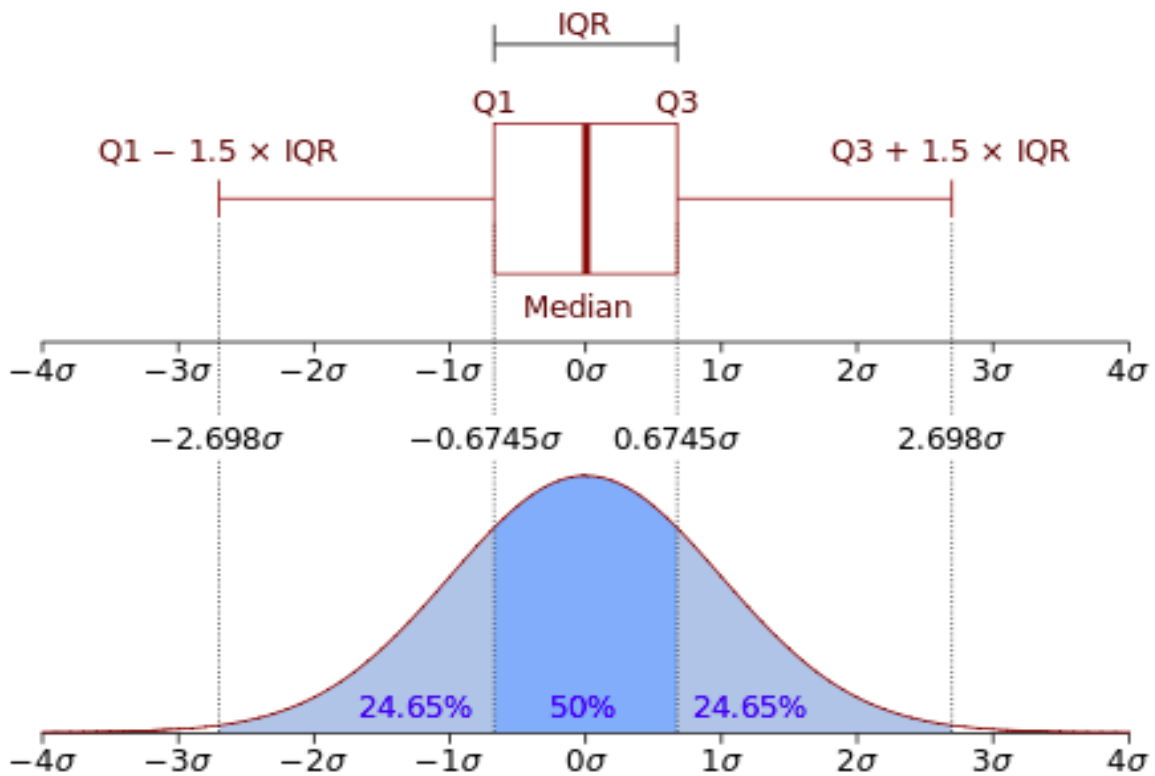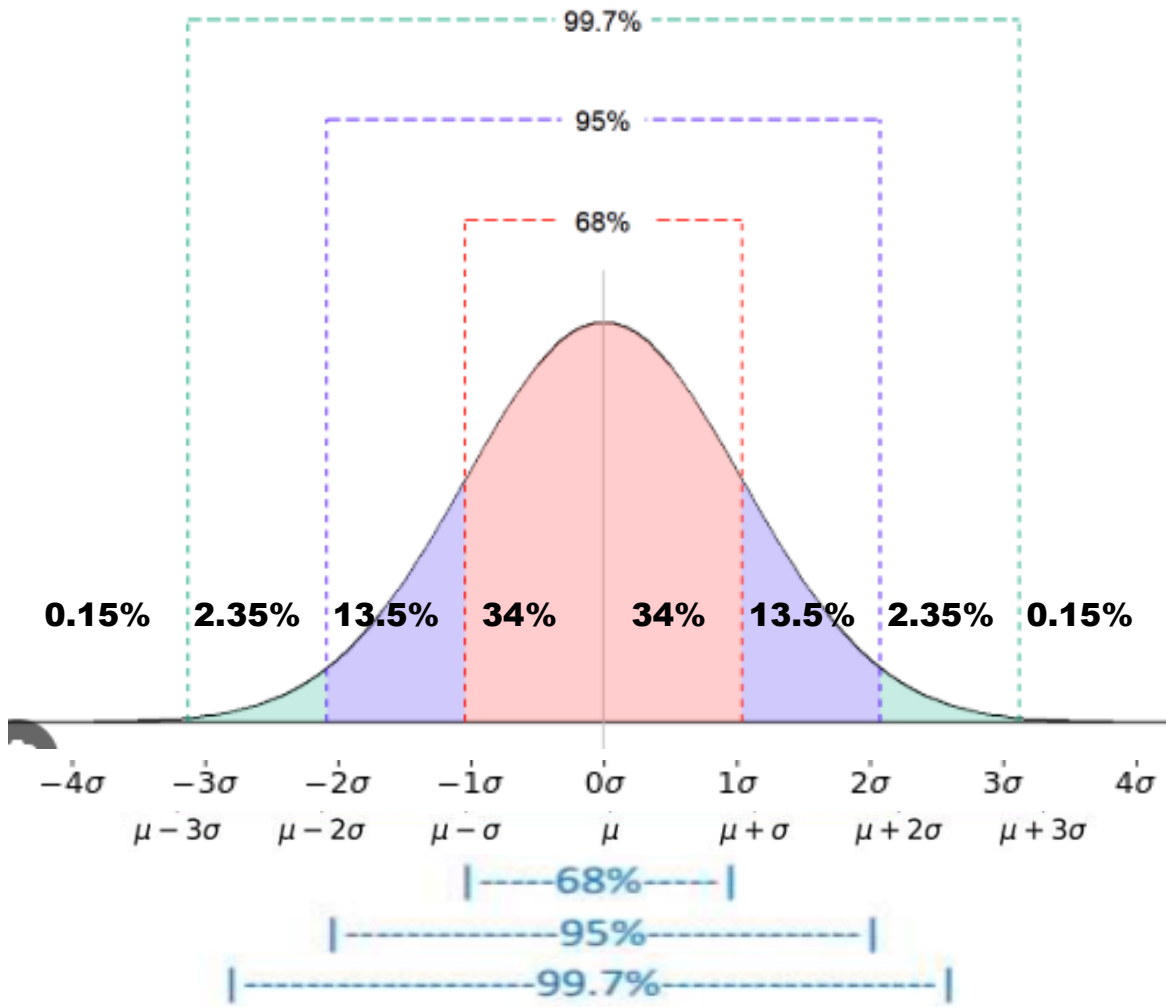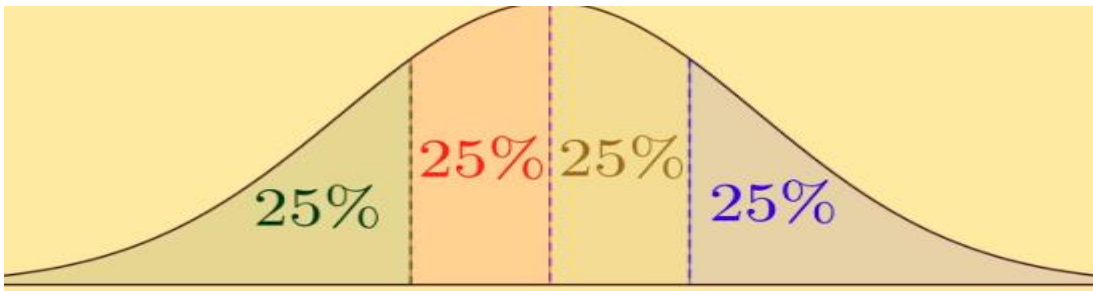-4σ -3σ -2σ -1σ 0σ 1σ 2σ 3σ 4σ

IQR = middle 50%

IQR is $Q_3 - Q_1$
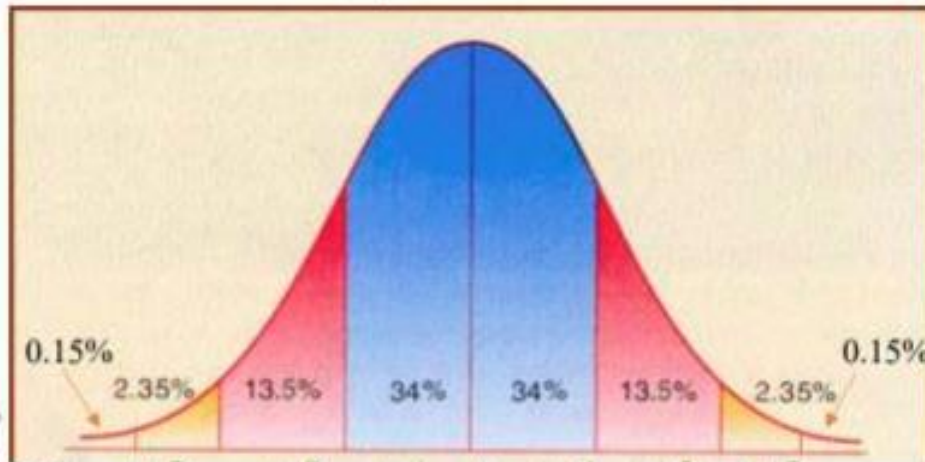
← 25th percentile ---- |

←---- 50th percentile --------- |

←------- 75th percentile ------------- |

Lower Fence = $Q1 - 1.5(IQR)$
Upper Fence = $Q3 + 1.5(IQR)$
Interquartile Range$(IQR) = Q3 - Q1$

Empirical Rule

0.15%   2.35%   13.5%   34%   34%   13.5%   2.35%   0.15%

Value away
From the mean $\mu-3$ $\mu-2$ $\mu-1$ μ $\mu+1$ $\mu+2$ $\mu+3$

Standard   ----3--------2--------1----0----1------2--------3--------
Deviations |-----68%-----|
|--------------95%--------------|
|----------------------99.7%--------------------|

· Approximately 68% of the data will lie within 1 standard deviation of the mean.
· Approximately 95% of the data will lie within 2 standard deviations of the mean.
· Approximately 99.7% of the data will lie within 3 standard deviations of the mean.

σ means standard deviation of the population Unadj. std. dev.

σ^2 means variance of a population Unadj. variance

s means standard deviation of a sample so use Std. dev.

s^2 means variance of a sample so use variance

EX μ = 120   **Using empirical rule:** what range is 95%

σ = 6.5   95% is 2 standard deviations

left: 120 − 6.5 − 6.5 = 107   right: 120+6.5+6.5=133

Range is **107 to 133**