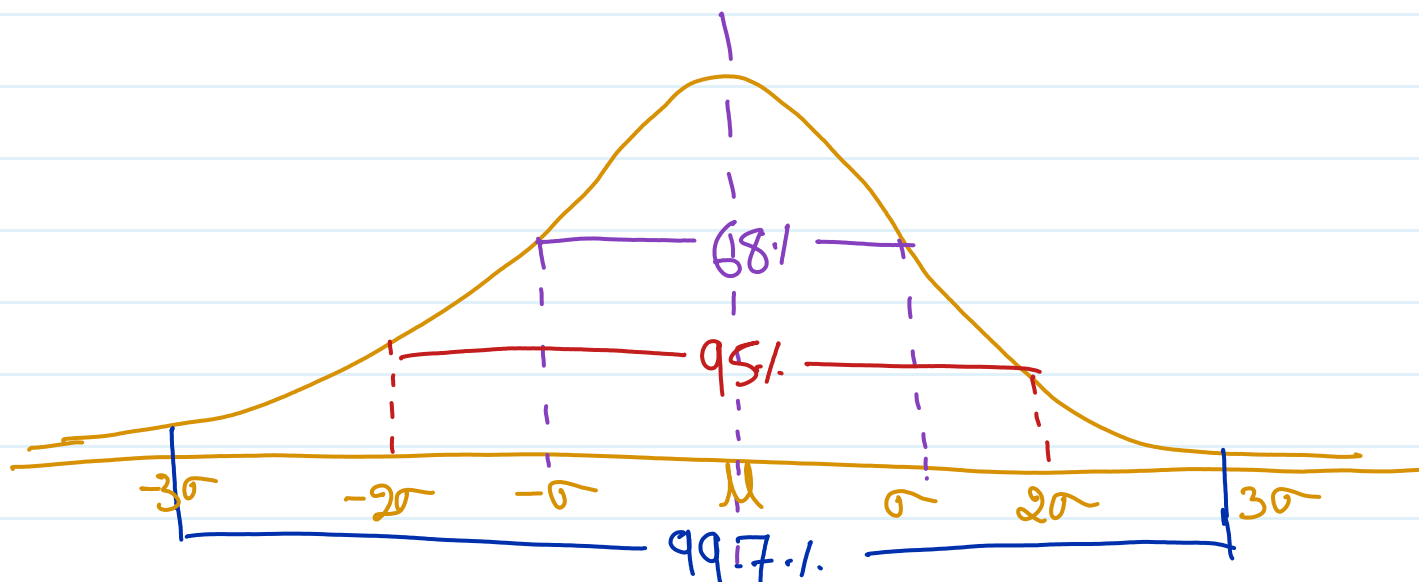


# ★ Empirical Rule of Dist.

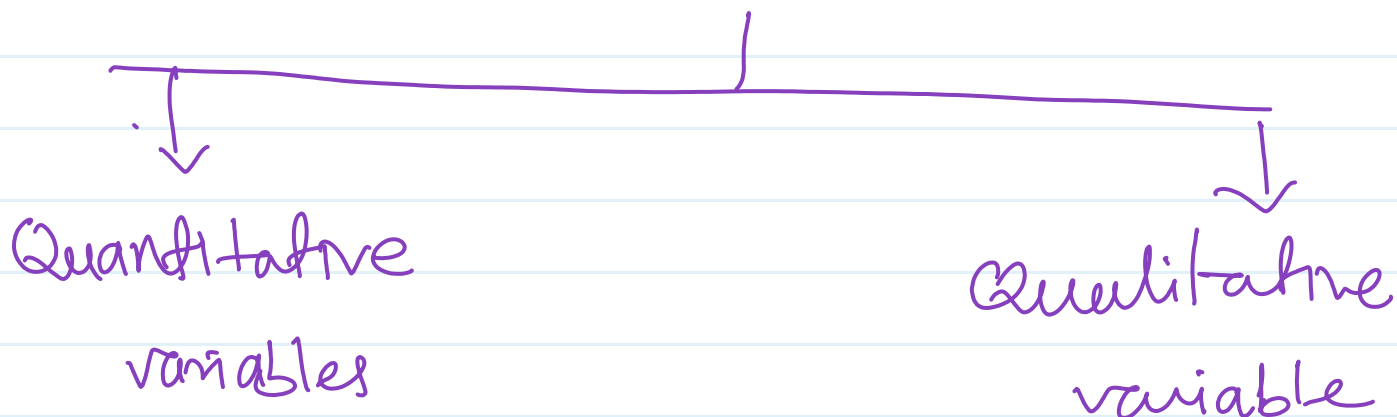


Formula - 68 - 95 - 99.7

## ★ Variable

X

Type of variables



# Quantitative variable

Discrete  
variable

childrens  
1/2/3/4

Bank A/c  
1/2/3/

pet  
1/2/3

Continuous  
variable

Height - 150 cm  
150.1 cm

weight - 50, 60.5

# Qualitative variable

Nominal Categories

M/F, P/F

T/F, H/T

V/N.V

w/L

ordinal cat.

① education - 10<sup>th</sup>, 12<sup>th</sup>, grad. Pg.  
Ph.D.

② Rank = Cont, SI, TI, DSP,  
SP, - - -

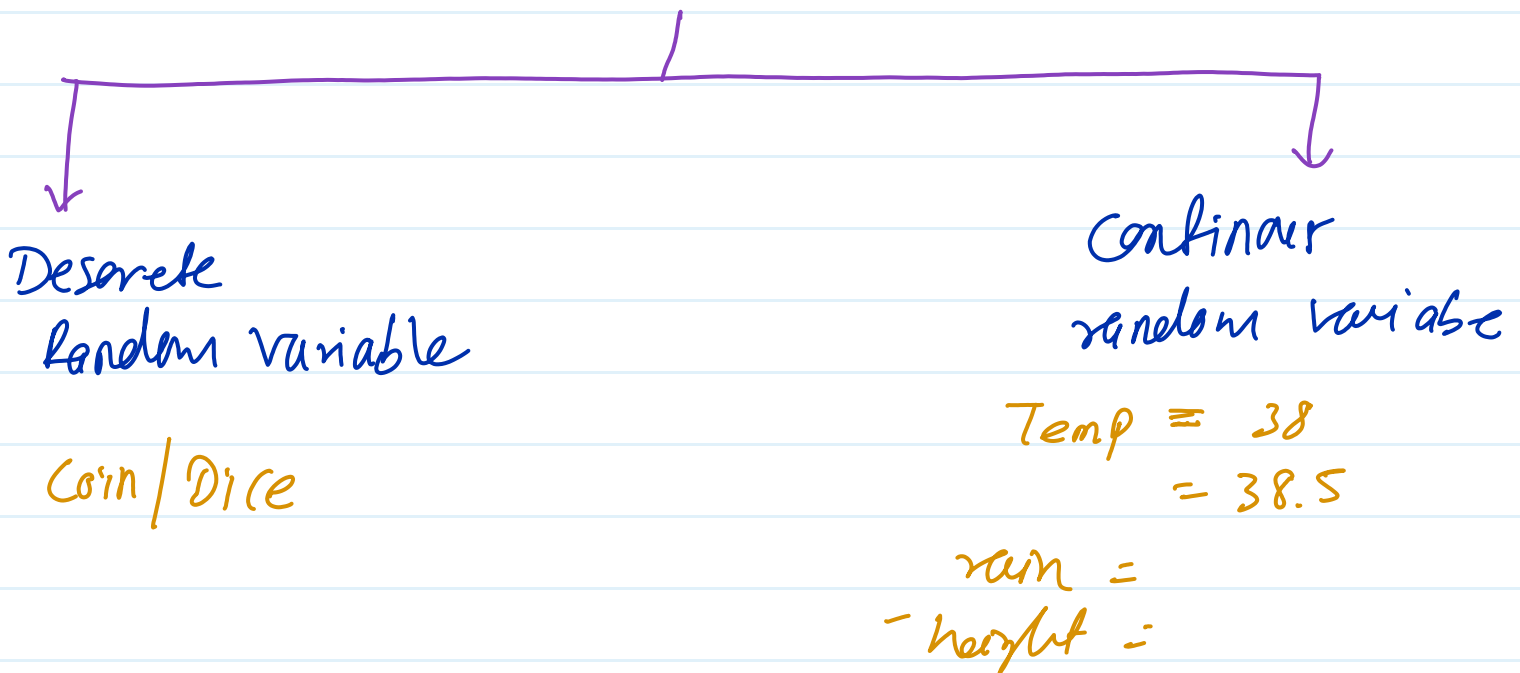
= drummer, junior,  
senior, team, Asst. mgt  
manager,

# \* Random variable

$$X = \text{Coin} \\ = H/T$$

$$Y = \text{Dice} \\ = 1/2/3/4/5/6$$

## Type of Random variable



# \* Percentile and Quantile

## \* Percentage

How many % of no are odd in given data  
 $\{2, 4, 7, 5, 8, 9, 10\}$

$$\text{Percentage} = \frac{3}{7} = 0.42 = 42\%$$

## \* Percentile

A percentile is a value below which a certain percentage of observation lies.

Data =  $\{2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12\}$

Q. - what is percentile ranking of 10?

$$\text{percentile ranking} = \frac{\# \text{ no. of value below } x}{n} \times 100$$

$$= \frac{15}{19} \times 100$$

$$\Rightarrow 78.9$$

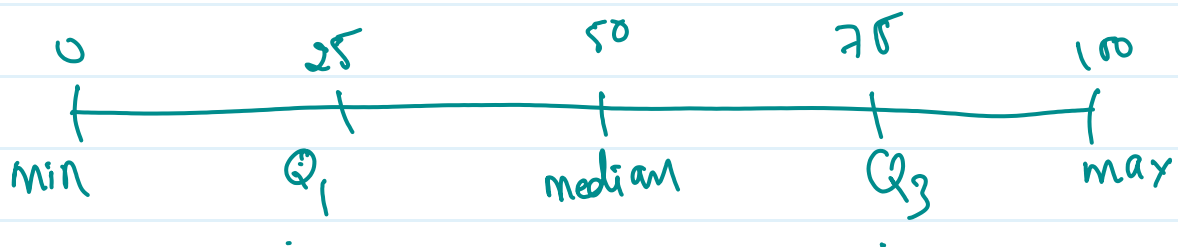
Eg:- what value exists at the percentile ranking of 25% !!

$$\begin{aligned} \text{value} &= \frac{\text{Percentile}}{100} \times (n+1) \\ &= \frac{25}{100} \times (19+1) \quad \frac{1}{4} \times 20 = \frac{20}{4} \\ &\Rightarrow 5 \text{ index position} = 5.4 \end{aligned}$$

$$\boxed{\text{value} = 5}$$

$$= \frac{5+5}{2} \Rightarrow 5 \checkmark$$

## ★ Quartile



Dataset - { 0.1, 0.05, 0.2, 1, 3, 5, 6, 9, 11, 2, 4, 29, 31 }

{ 0.05, 0.1, 0.2, 1, 2, 3, 4, 5, 6, 9, 11, 29, 31 }

# ★ 5 Number Summary

- ① minimum
- ② first Quartile
- ③ median
- ④ Third Quartile
- ⑤ max

$$\text{lower fence} = Q_1 - 1.5(IQR)$$

$$\text{upper fence} = Q_3 + 1.5(IQR)$$

Inter quartile Range

$$IQR = Q_3 - Q_1$$

$$Q_1 (25\%) = \frac{25}{100} \times (n+1)$$

$$= \frac{25}{100} \times 14 \Rightarrow 3.5^{\text{index}} = 0.2$$

$$Q_3 (75\%) = \frac{75}{100} \times 14 \Rightarrow 10.5^{\text{index}} = 11$$

$$IQR = Q_3 - Q_1$$

$$= 11 - 0.2 \Rightarrow 10.8$$

$$\begin{aligned}\text{lower fence} &= Q_1 - 1.5(IQR) \\ &= 0.2 - 1.5(10.8) \Rightarrow 0.2 - 16.2 \\ &= -16\end{aligned}$$

$$\begin{aligned}\text{upper fence} &= Q_3 + 1.5(IQR) = \\ &= 11 + 1.5(10.8) = \\ \Rightarrow 11 + 16.2 &= 27.2\end{aligned}$$

\* Box and whisker plot:-

