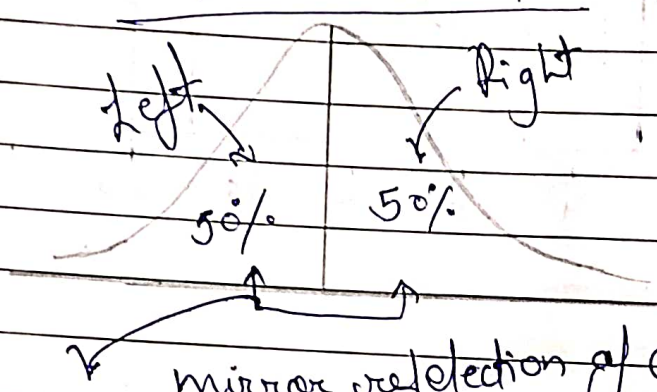
Day 3.

(i) Normal Distribution / Gaussian distribution
(ii) Standard Normal Distribution
(iii) Z- score.

Emperical Rule (Property of Gaussian Distribution)

* Normal Distribution / Gaussian Distribution

Summetrical



mirror reflection of data.

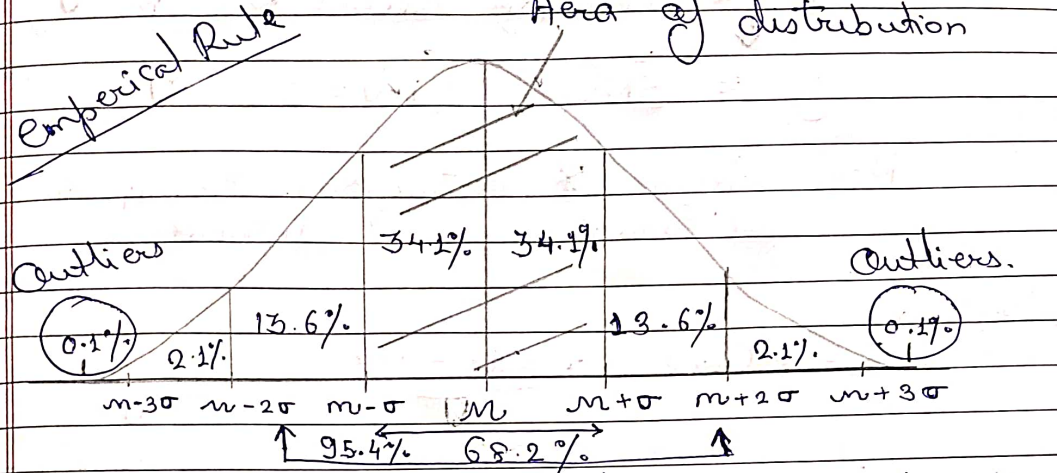
Identical to each others.

eg: Weight of people in the City ?

Weight of people in the City

As here This data was Collected by an domain expert (Doctor)
As here we can says that the height and weight of people in the City was Identical to each others.

As example of Normal Distribution
Lets understand the Concept.



As here I have one dataset of X with 100 numbers.

$$X = \{1, 2, 4, 8, 10, 12 \text{ ------ } 100\}$$

68.2%

As By adding the both numbers 34.1% + 34.1% output is 68.2%
It Consider that the 68.2% of distribution is available in 1st area. (first standard distribution).

As also By adding an 2nd standard distribution (13.6%) output is an 95.4% which indicates that 95.4% of distributio available in this area of distribution.

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* Standard Normal Distribution

$x \approx$ Gaussian Distribution (m, σ)

$\Downarrow$

$y \approx$ SND $(m = 0, \sigma = 1)$

Here from x distribution trying to convert in y distribution.

Formula

$$Z\text{-Score} = \frac{x_i - m}{\sigma}$$

$$\frac{x_i - m}{\frac{\sigma}{\sqrt{n}}} \quad \left(\sqrt{n} = 1\right)$$

$$\frac{x_i - m}{\sigma}$$

$\{1, 2, 3, 4, 5\}$

$m = 3$

$\sigma = 1$

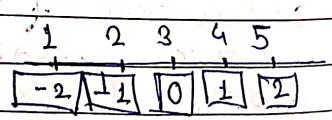
$\{1, 2, 3, 4, 5\}$

$\Downarrow$

Z-Score

$\{-2, -1, 0, 1, 2\}$

$$\frac{x_i - m}{1} = \frac{1-3}{1}$$



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Assignment (Z-Score)

$[\mu = 0, \sigma = 1]$

$X = \{2, 3, 4, 5, 8\} \Rightarrow y\{\ ?\ \}$

$\mu = ?$
$\sigma = ?$

$\mu = 4.4$
$\sigma = 2.05$ (Assumed)

Formula : $Z\text{-Score} = \frac{x_i - \mu}{\sigma}$

$2 = -1.17$
$3 = -0.68$
$4 = -4.09$
$5 = 0.29$
$8 = 1.75$

Q. Why we learn Standard Normal D

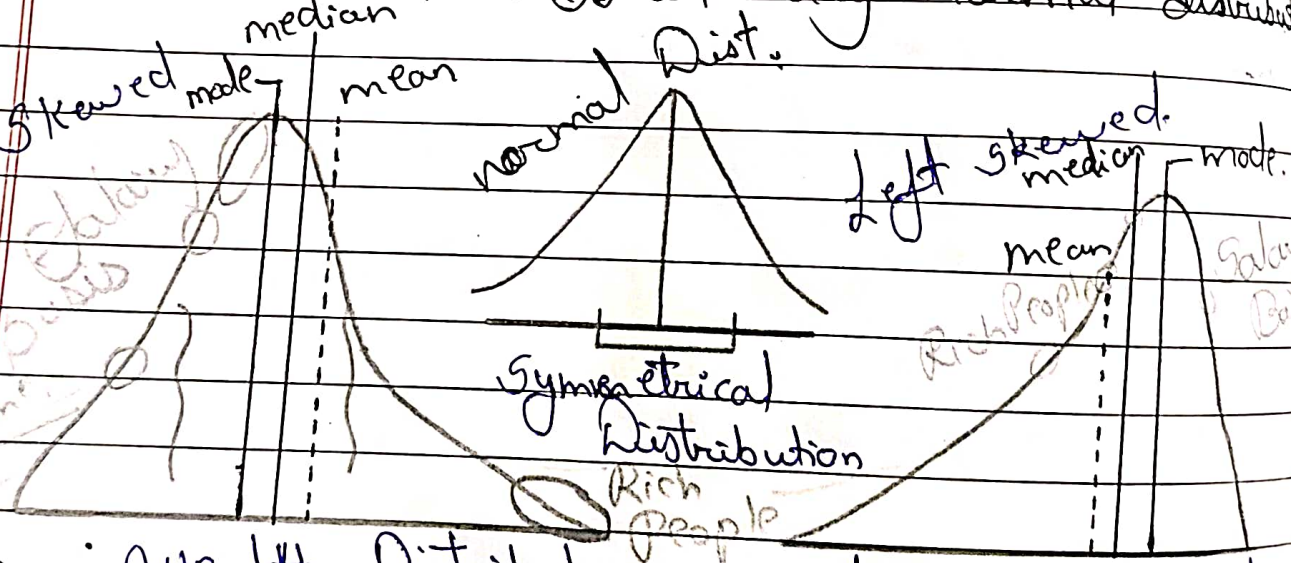
→ Standard Normal Distribution, Scale da
data into same Scale.
eg :- $\mu = 0$, $\sigma = 1$.

Q. z-score ?

If we have an data set $x_i \sim$ Normal Distribution (μ, σ) and trying to Convert in $y \sim$ SND with condition of $(\mu = 0, \sigma = 1)$ with formula of Z-score. $\left(\frac{x_i - \mu}{\sigma}\right)$ it is also called Standardization

* Assignment

Define the difference between mean, mediad and mode in log normal distribut



Examples. : Wealth Distribution
Length of Comment
Life span of Hum
Being

As the relationship between mean, median and mode.

(1) Positive Skewed : mean > median > mode

(2) Symetrical Dist : mean ≈ median ≈ mode

(3) Negative Skewed : mode > median > mean.