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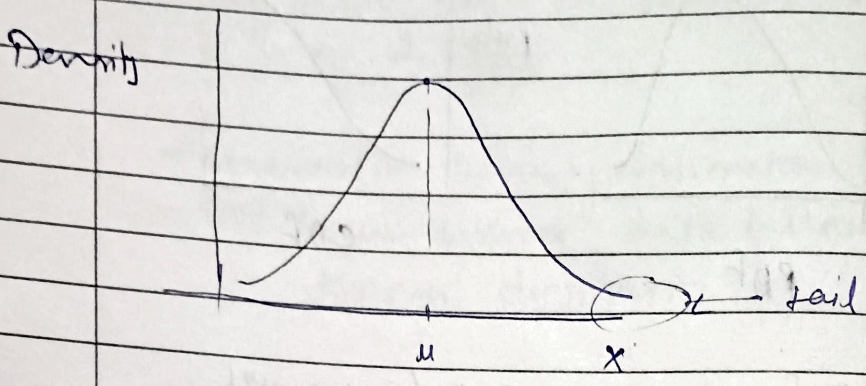
Normal Distribution.

→ Gaussian Dist



· most of the elements are near the peak of curve very less element are at tail.

· Two parameters → mean(μ)
→ Std. deviation (σ)

$X \sim N(\mu, \sigma)$

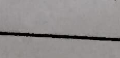
· many Natural phenomenon follow this dist

· $y = f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$

· using mean we can shift
using σ we can increase or decrease height

→ Understanding Eqⁿ-

· $y = e^{-x^2}$
↳ give



· Area under graph will be $\sigma\sqrt{2\pi}$
So we divide it by $\sigma\sqrt{2\pi}$

· Standard Normal Dist. :-

↳ $\mu = 0$, $\sigma = 1$

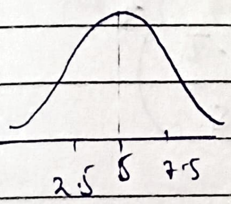
$Z \sim N(0, 1)$

Benifits → · we can compare graph

· we can calculate prob. as we know it

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$$

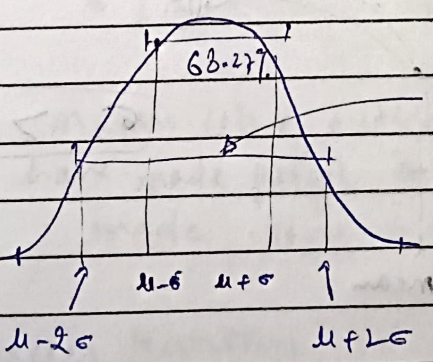
· $N(5, 2.5)$



→ Not standard N.D.

we do $\frac{x - \mu}{\sigma}$

· Emperical Rule



) $\mu - 3\sigma$ to $\mu + 3\sigma$

↳ 99.73%

· Property of Normal Dist.

· Symmetric

· mean = median = mode

· Area under curve = 1

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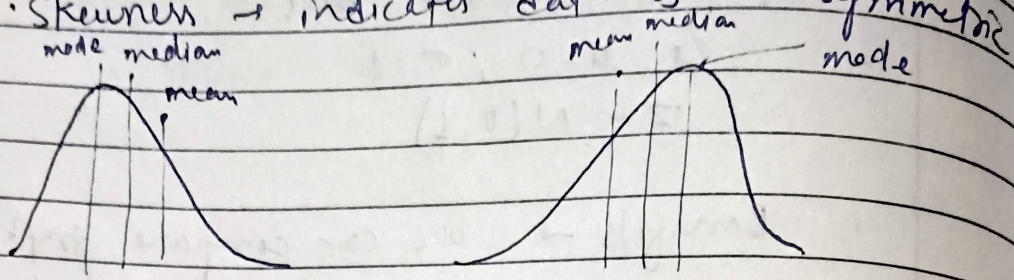
· Skewness → indicates data is non-symmetric



+ve skew
Right skewed

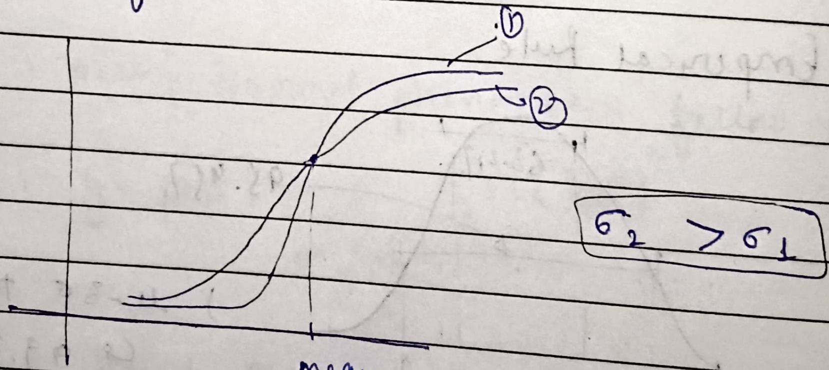
-ve skew
Left skewed

→ more the skewness more will be dist. b/w mean, median & mode

→ Skew formula -

$$\frac{n}{(n-1)(n-2)} \sum \left(\frac{x - \bar{x}}{s} \right)^3$$

· CDF of Normal dist.



· Its use in DS -
- Detecting outlier
- Hypothesis testing
- Central limit thm