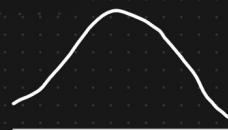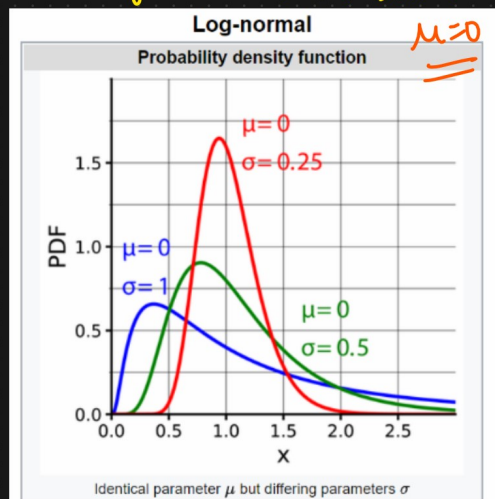# ① Log Normal Distribution

In probability theory, a log-normal (or lognormal) distribution is a continuous probability distribution of a random variable whose logarithm is normally distributed. Thus, if the random variable X is log-normally distributed, then Y = ln(X) has a normal distribution. Equivalently, if Y has a normal distribution, then the exponential function of Y, X = exp(Y), has a log-normal distribution

LND is **Right Skewed Distribution**

Log-normal
Probability density function
$\mu = 0$

μ = 0
σ = 0.25

μ = 0
σ = 1

μ = 0
σ = 0.5

Identical parameter μ but differing parameters σ

$$X \sim \text{Log Normal Distribution}(\mu, \sigma)$$

$$\Downarrow$$

$$Y \sim \ln(x) \xrightarrow{\text{belongs to}} \text{Normal Distribution}$$

$$\Downarrow$$

Natural Log

$$[\log_e]$$

$$\Downarrow$$

$$X \sim \exp(Y) \Rightarrow \text{Log Normally Distributed}$$

now lets say :

Log Normal Distribution

we have
Random variable

x

we apply :

$$\ln(x)$$

$$\Longrightarrow$$

we get :
exp(y)

Normal Distribution

$$\Downarrow$$
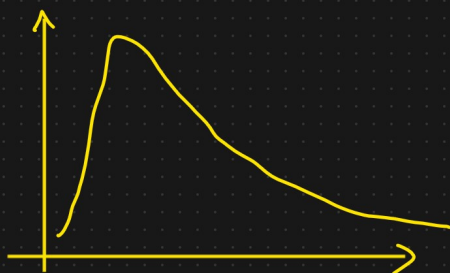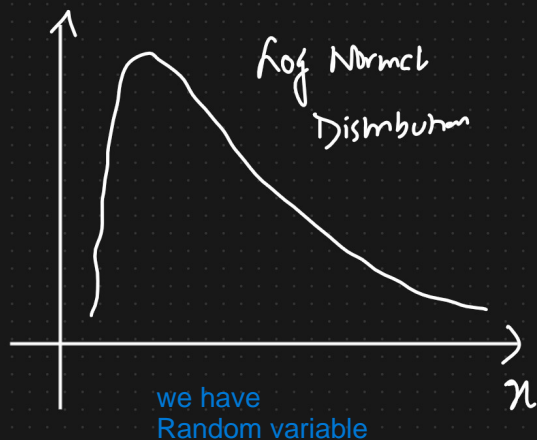
QQ plot

we get
Normal distribution

y
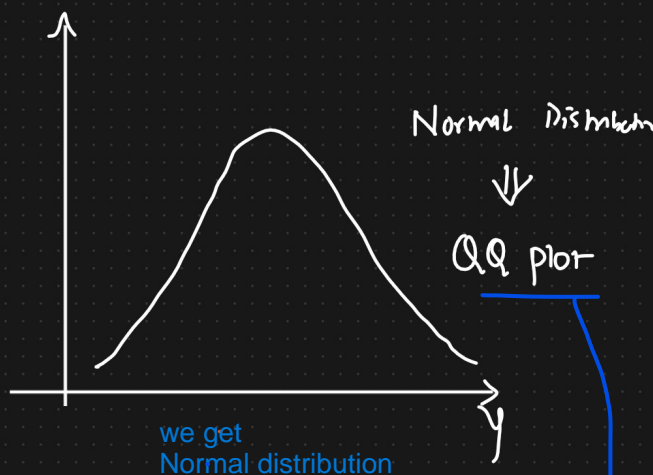
QQ plot technique is used to check weather distribution is normal or not

Eg :-

① Wealth distribution of the world

② Discussion Forum → Length of the comments

③ Length of chess games

④ Dwell time on online articles (joke, news)

⑤ Salaries of employees in a company.

→ splenied

Bill Gates
Adani
Elon Musk

Wealth

very less people
has more wealth