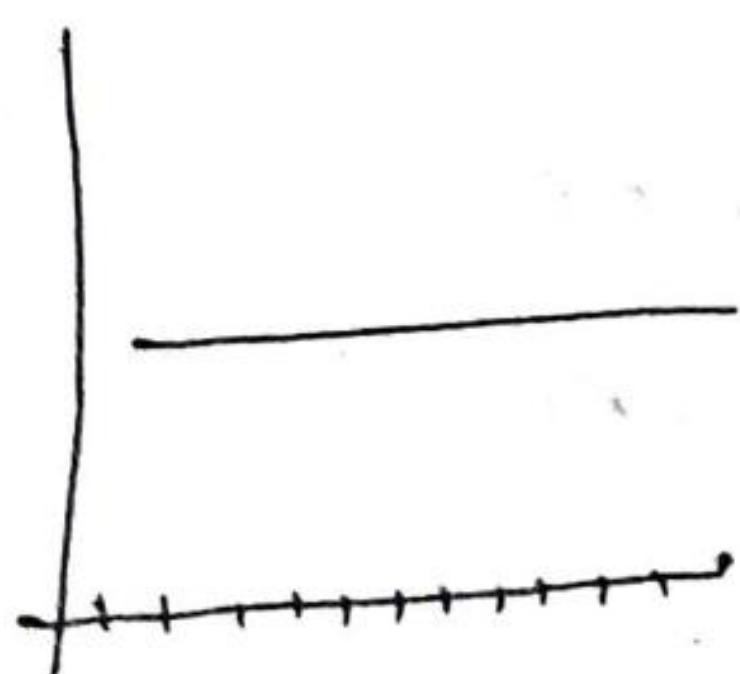


Central limit theorem (CLT) :-

* If we have a population which follows any distributions such as uniform or exponential distribution, and if we take sufficiently large random samples from the population, then the sample means will be approximately normally distributed.

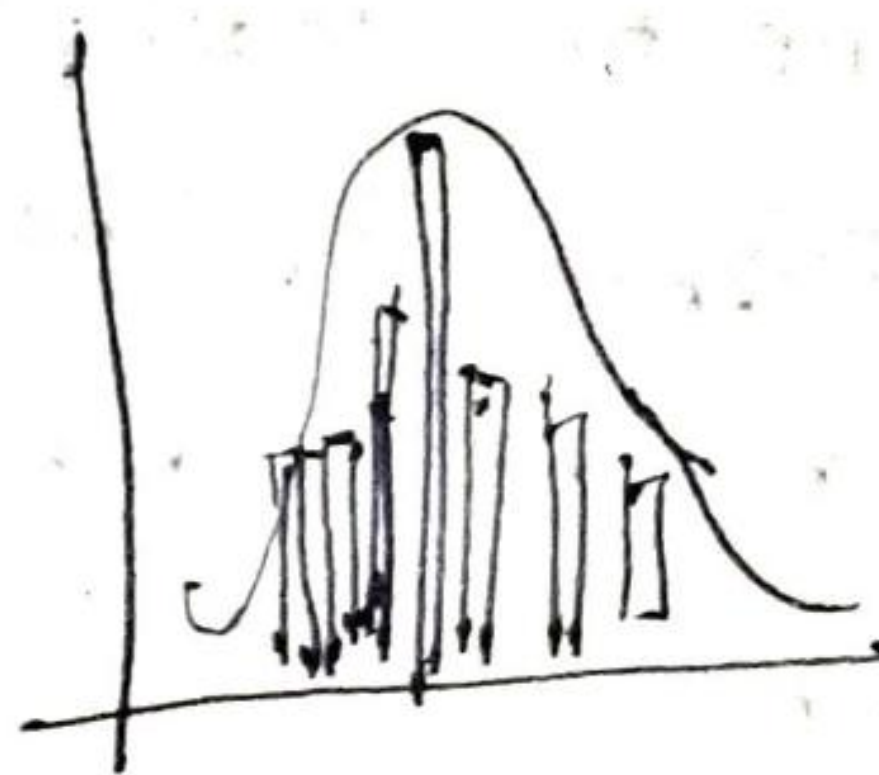
* CLT is the core for hypothesis testing.

* Sample n can be of size 30, we can ~~start~~ start with 30, and can gradually increase, but don't increase too much.

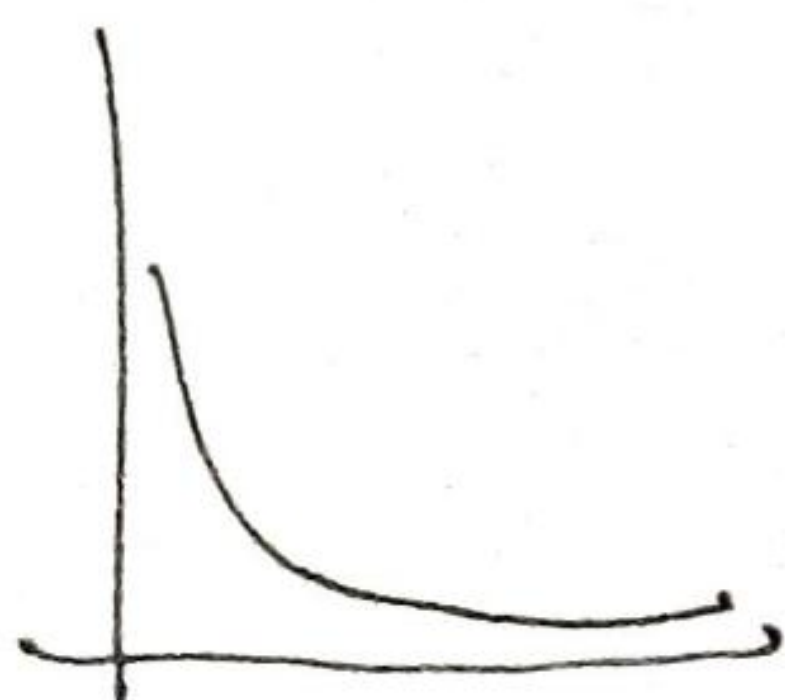


uniformly
distributed

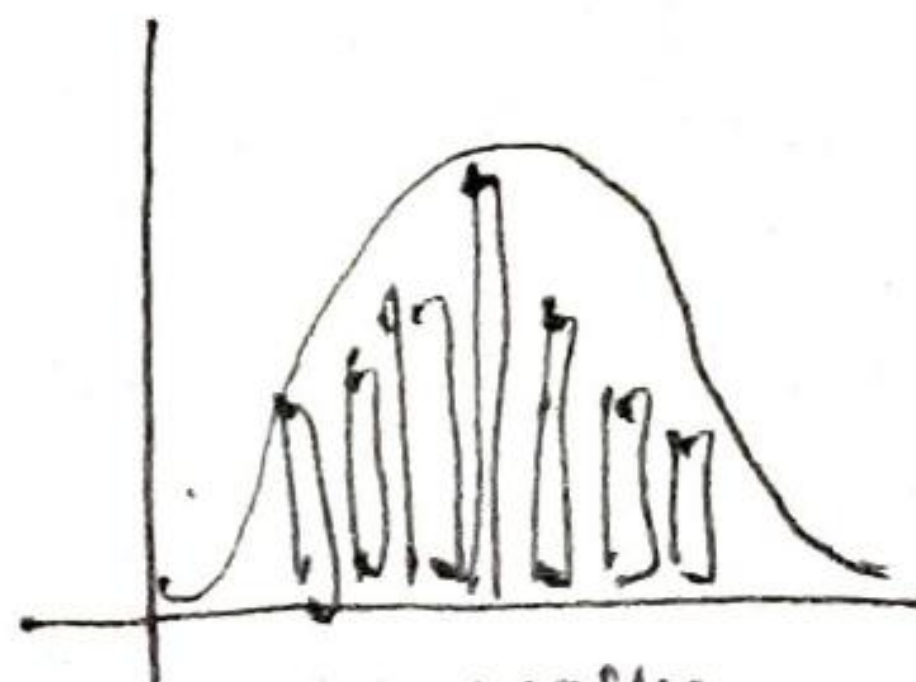
Taking 100 samples
and calculating 100
sample means



It is normally
distributed



exponentially
distributed



normally
distributed.

Real time use case:-

- * If i am a Fish farm owner
- * My work is to ~~breed~~ breed the fishes and make them sell in the market
- * I can get more money and profit if my fish is very large.
- * But the challenge is how long it will take to make the fish grow.
- * Because i want to say the exact time for the growth of the fish to my dealer.
- * If I have more number of fishes it is impossible to ^{measure} size of each fish manually.
- * So if i take average size of the fishes, i can come to clear picture.
- * Suppose if i have 20 fish reservoirs or fish tanks and in each tank i have 1000 fishes.
- * So totally the population is 20000, so i cant calculate size of each fish manually

* My main goal is to make all the 20000 fishes to the optimal size and want to sell and make profit.

* My dealer orders me that he wants the fish in the size of 50 cm.

* Lets consider 50 cm as the optimal size, so now how we can check our process and optimize the process.

* 20000 fishes may have different sizes, it can follow any distributions.

* So i will take ~~some~~ n samples from the population.

* first i will take 1st sample as 30 fishes and i will calculate the mean of size of fishes in the sample.

* Likewise, i will gradually increase the sample size and will ending with taking 100 samples with samples means.

* Now i have 100 sample means.

* This 100 means will follow the normal distribution.

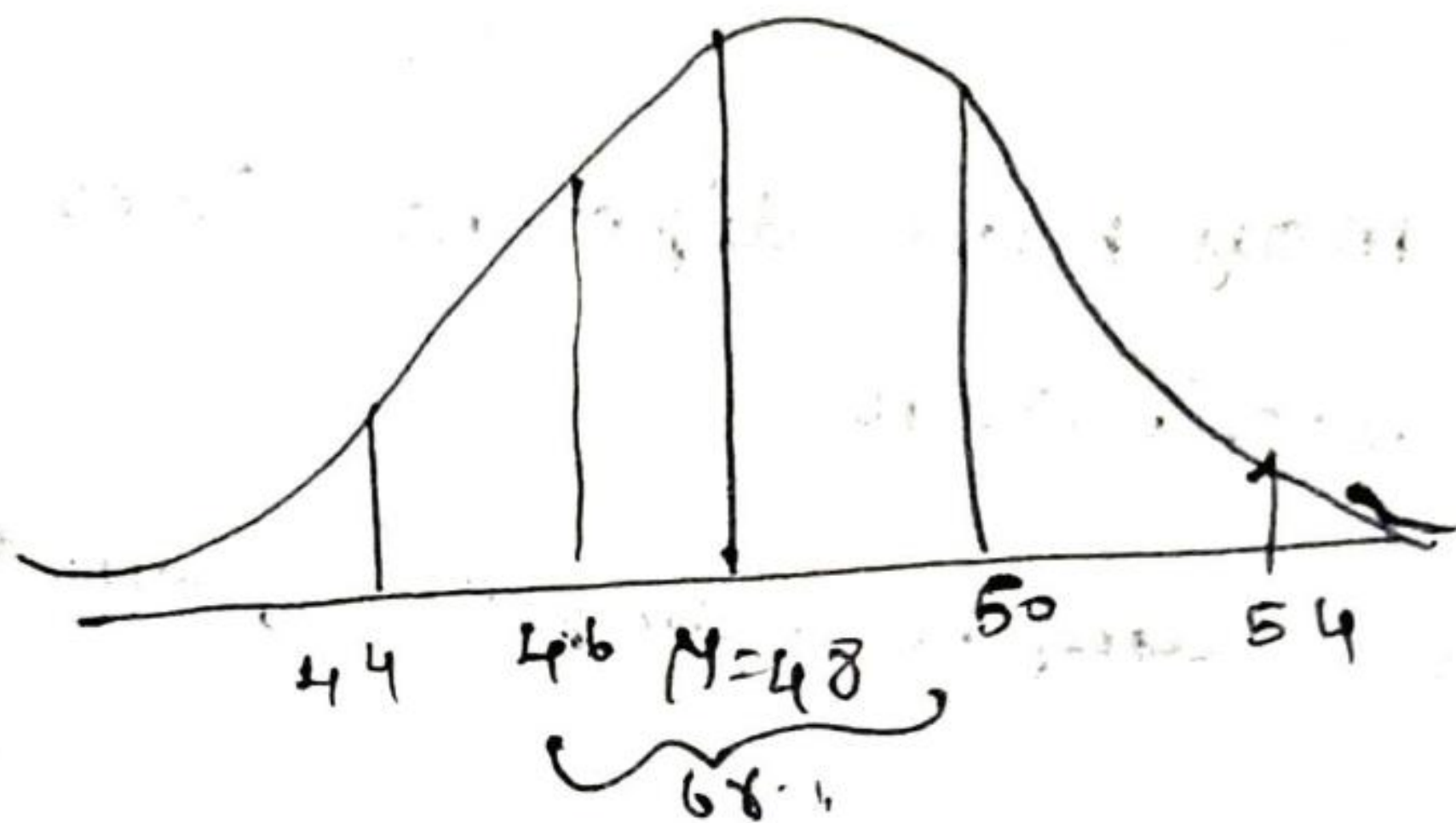
* This is what central limit theorem states

~~* Suppose if I get population~~

~~* Step~~

* For a gaussian distribution we need a
+ So we want to calculate the mean of
100 sample means.

* If I get mean as 48 and std. dev
2.



* It gives me clear picture that 68.1% of
fishes are around 46 to 50 cm so I will
now optimize or speed up my process
by feeding more to the fish.