Question is it binomial or not?

Central limit theorem is
True if · ① sample size ≥ 30
② sample size $< 10\%$ of population size

Binomial settings

Yes / No   In / out

proportion: Yes or No

population parameter: population proportion P

Sample statistic: sample proportion $\hat{P}$

$\hat{P}$ estimates P by CLT ·—

sampling dist

distribution of sample proportions

$$\{ \text{normal} \} \text{ CLT}$$

$$np \geq 10$$
$$n(1-p) \geq 10$$

① You pick a sample of size 30 randomly

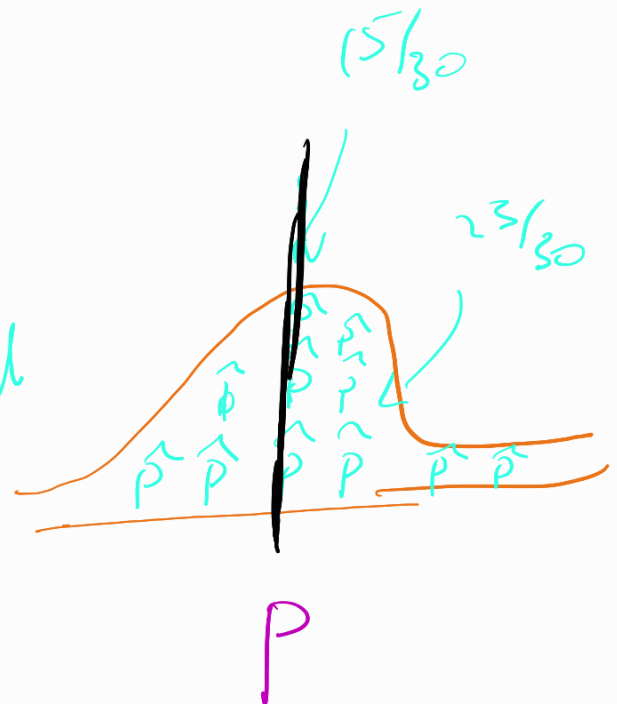② measure the sample statistic $\left(\dfrac{15}{30} \text{ vs } \dfrac{23}{30} \right)$

③ put your sample statistic in bag

④ Repeat

μ

σ

$\dfrac{15}{30}$

$\dfrac{23}{30}$

$\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$

P

Mean of sampling dist = P
Sample proportions

Standard dev of = $\sqrt{\dfrac{P(1-P)}{n}}$
Sampling dist
sample proportions

Non binomial settings

means

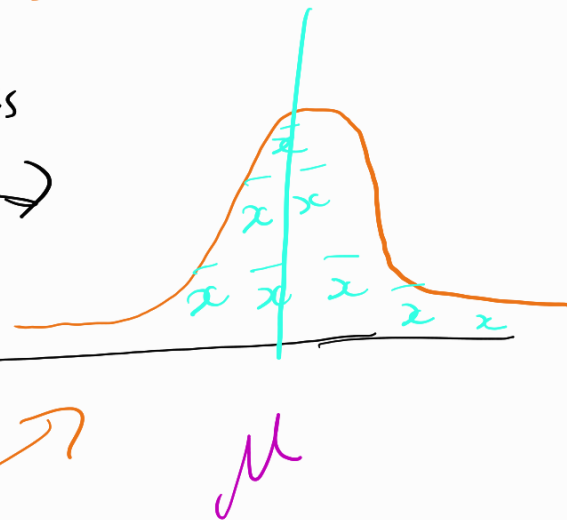population parameter | population mean $= \mu$

sample statistic: sample mean $\bar{x}$

$\bar{x}$ estimates μ by CLT ...

Sampling distribution of sample means

Pick samples and measure $\bar{x}$

X

μ

μ

result of a billion different sample $\bar{x}$'s

"mean of [sampling dist] of sample means" : μ

SD of sampling dist. of sample means : $\frac{\sigma}{\sqrt{n}}$

"Mean / SD of sampling dist of { sample statistic }"