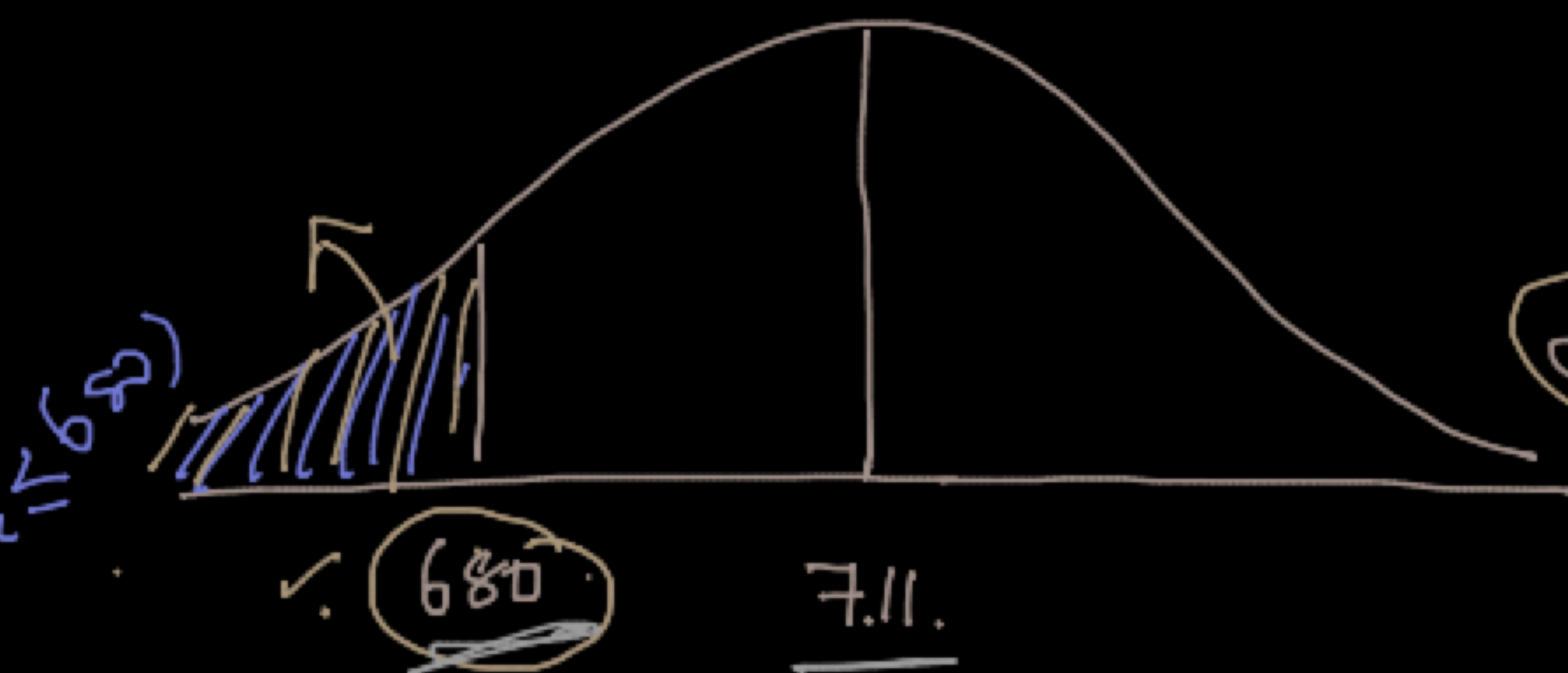
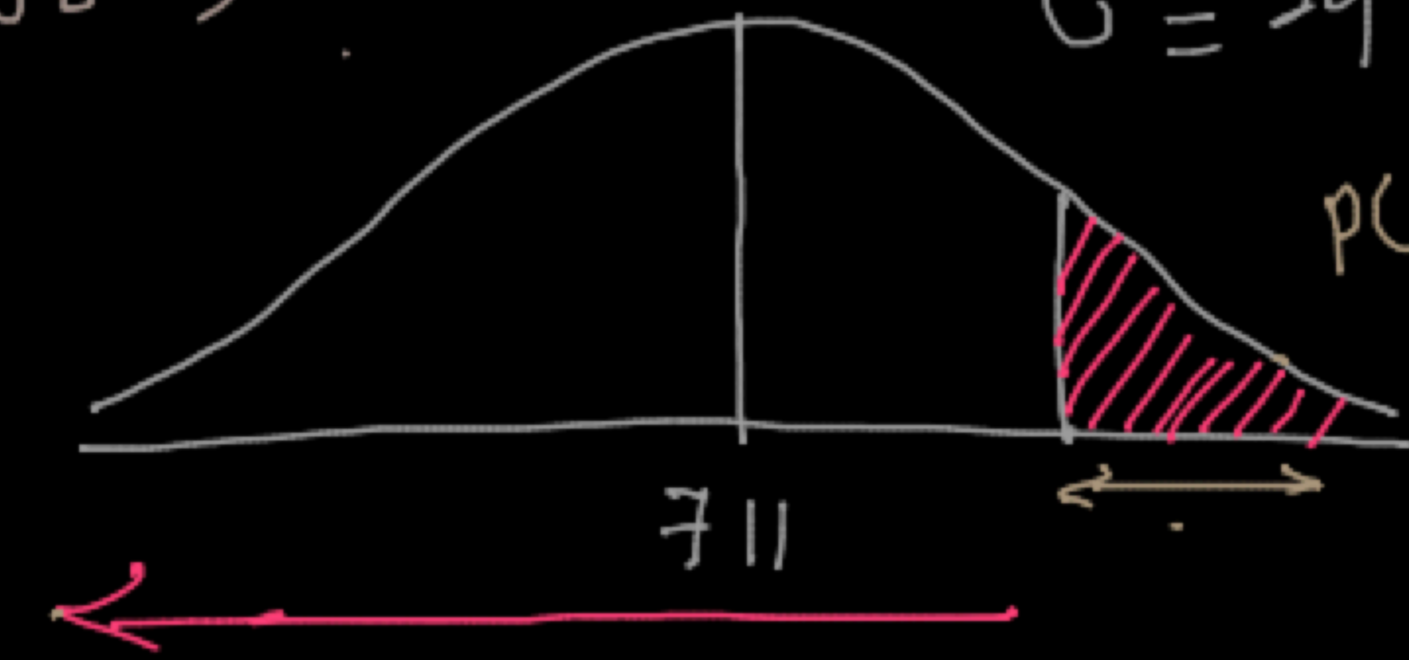
GMKT.



$P(X \le 680)$

$\sigma = 29$

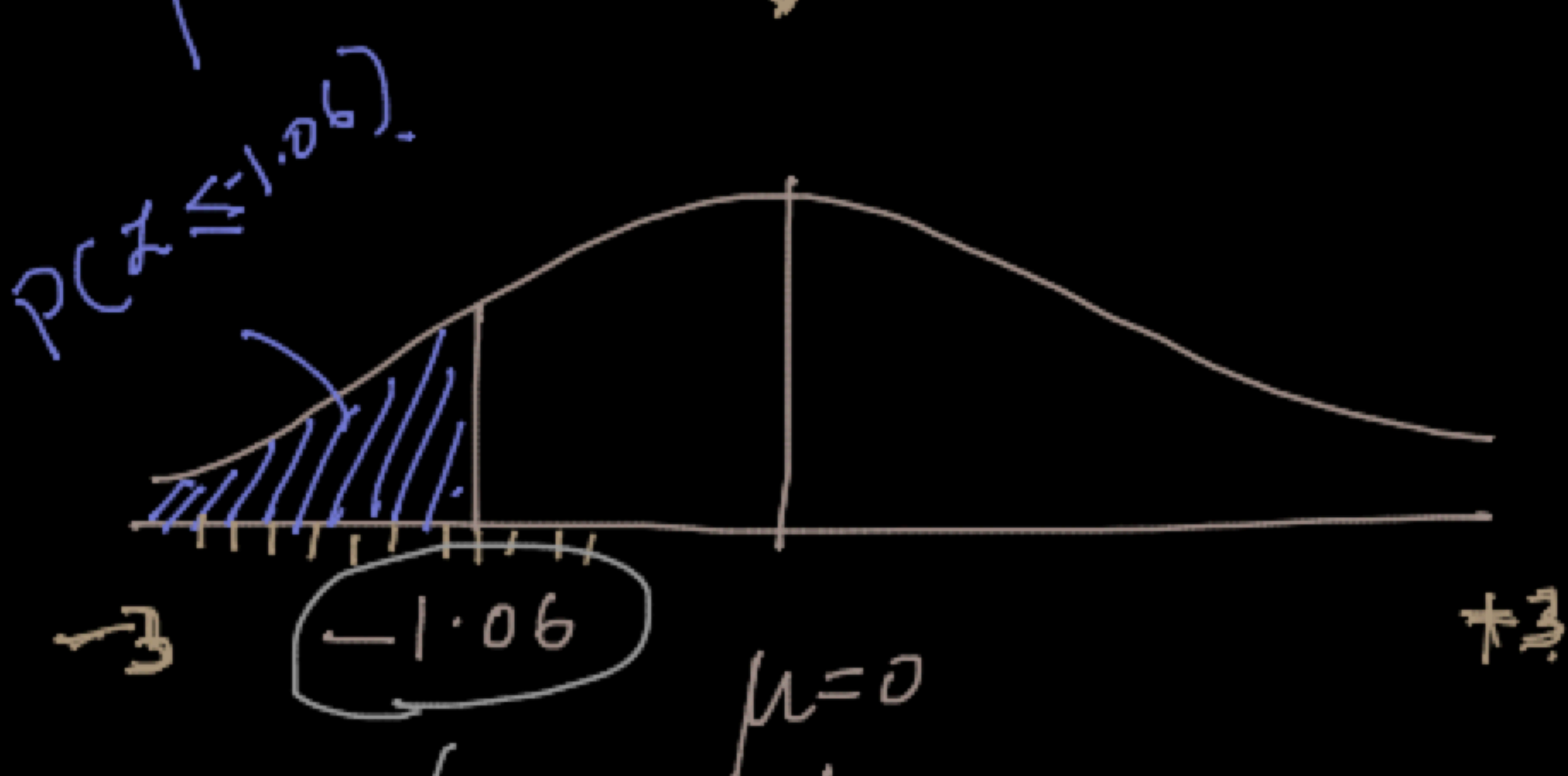


$P(X \le 720)$. $1 - P(X \le 720)$

$= P(X > 720)$

⇓ Standard.

⇓ Stw



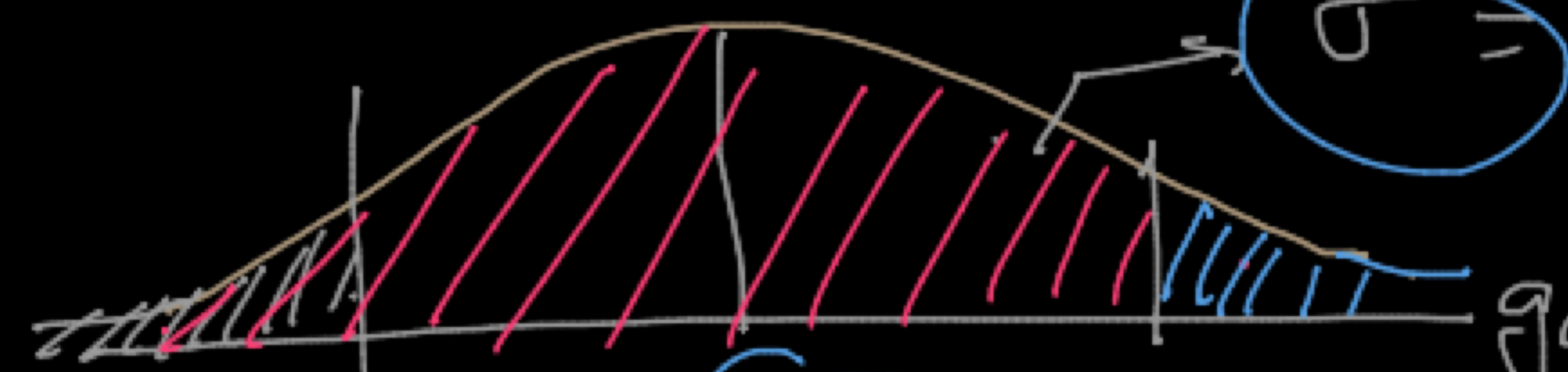
0.1447

$$Z_{680} = \frac{680 - 711}{29} = -1.06$$

Python → cdf(680, 711, 29)

$= P(X \le 680)$

$P(X > 720) = 1 - \text{cdf}(720, 711, 29)$



$\sigma =$ beml_df['gain'].std()

beml_df gain

gain

-0.02 μ 0.02

beml_df['gain'].mean()

$\text{cdf}(-0.02, \mu, \sigma)$

$1 - \text{cdf}(+0.02, \mu, \sigma)$

glaxo.df gain

Marks

$X. \qquad (X-\bar{X})$

$x_1 \rightarrow (x_1-\bar{X})^2$

$x_2 \rightarrow (x_2-\bar{x})^2$. First moment

→ Mean Value.

→ Central Value.

$\sigma^2 = 100.$

$\sigma = 10.$

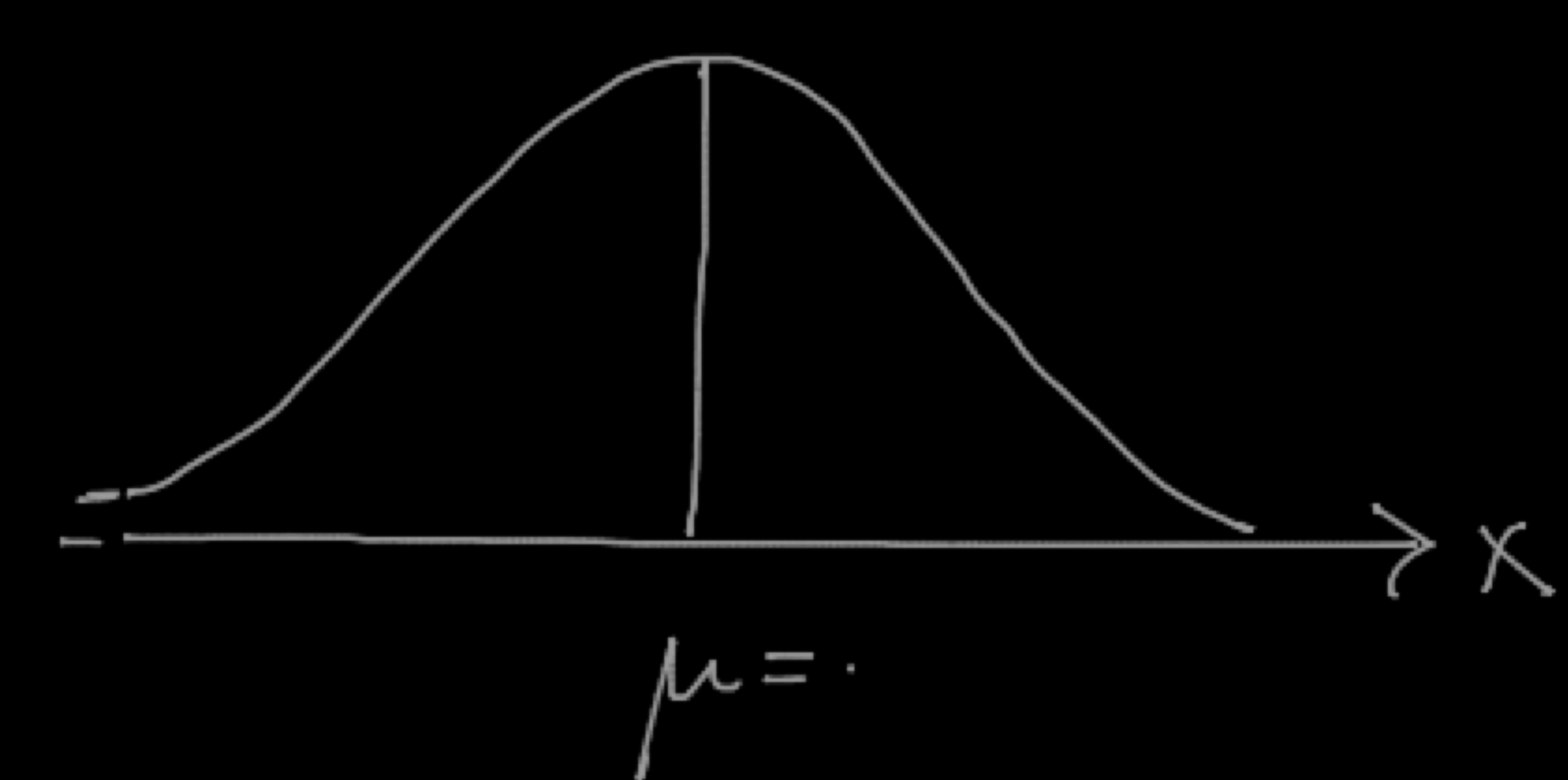
2. Second moment

— Variance

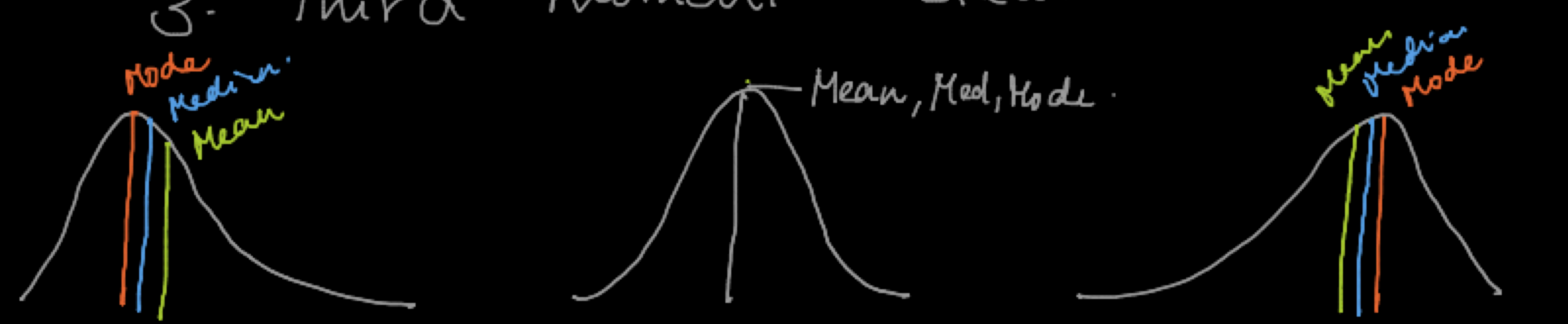
Moments

→ Define the shape of a distribution.

— Four moments of ND



3. Third moment — Skewness

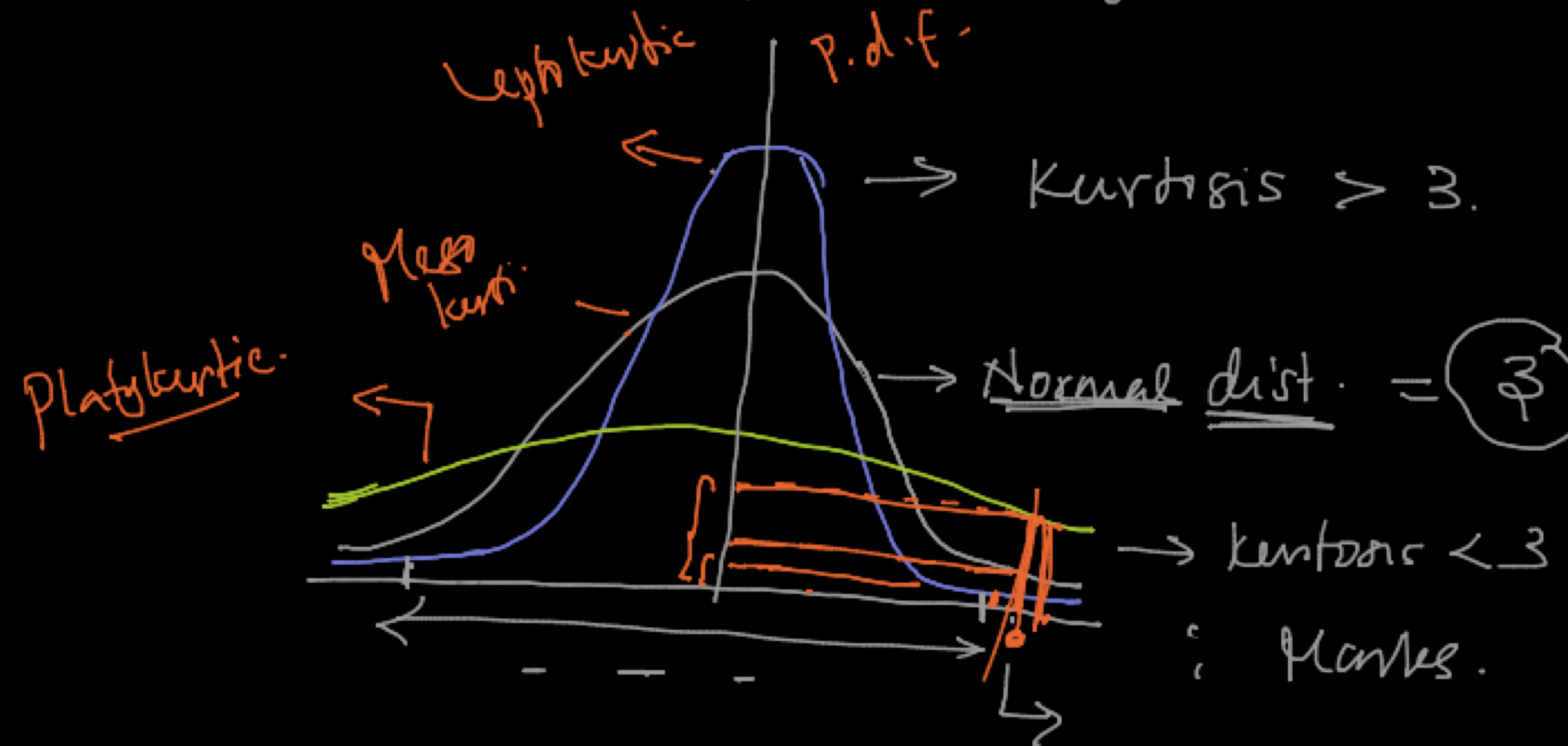


Right Skew

Left Skew

→ Marks.

4. Kurtosis → Peakedness of the dist.



Excess kurtosis. ✓

⟹ (Kurtosis − 3)

+ve; −ve

= 0.

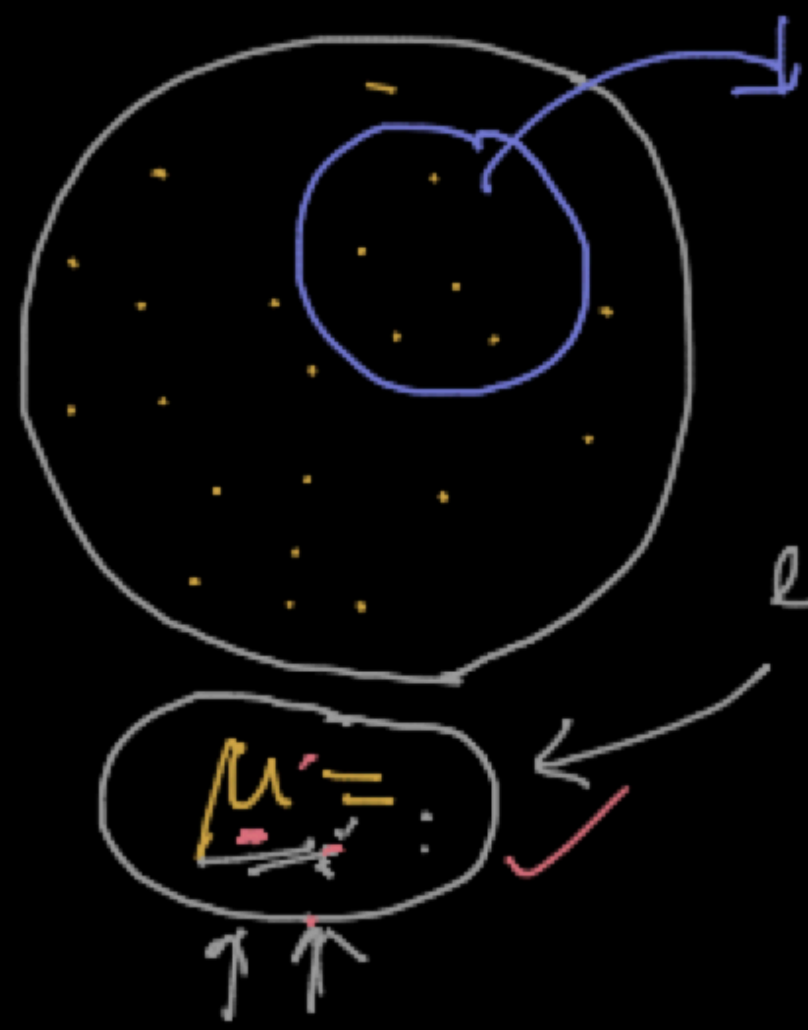
Tail → prob. of finding extreme value.

Central Limit Theorem

$n = 1000$

Sample

$\bar{x} = ?$



estimate

$\mu = $

1.3 Billion

$\mu_{\bar{x}} = \mu_{pop}$

$\sigma_{\bar{x}} = \sigma_{pop} / \sqrt{n}$

$n \rightarrow$ Sample Size

Sample Means

$\bar{x}_1 = 1500$

$\bar{x}_2 = 1350$

$\bar{x}_3 = 1800$

⋮

$\bar{x}_{1000} = 2200$

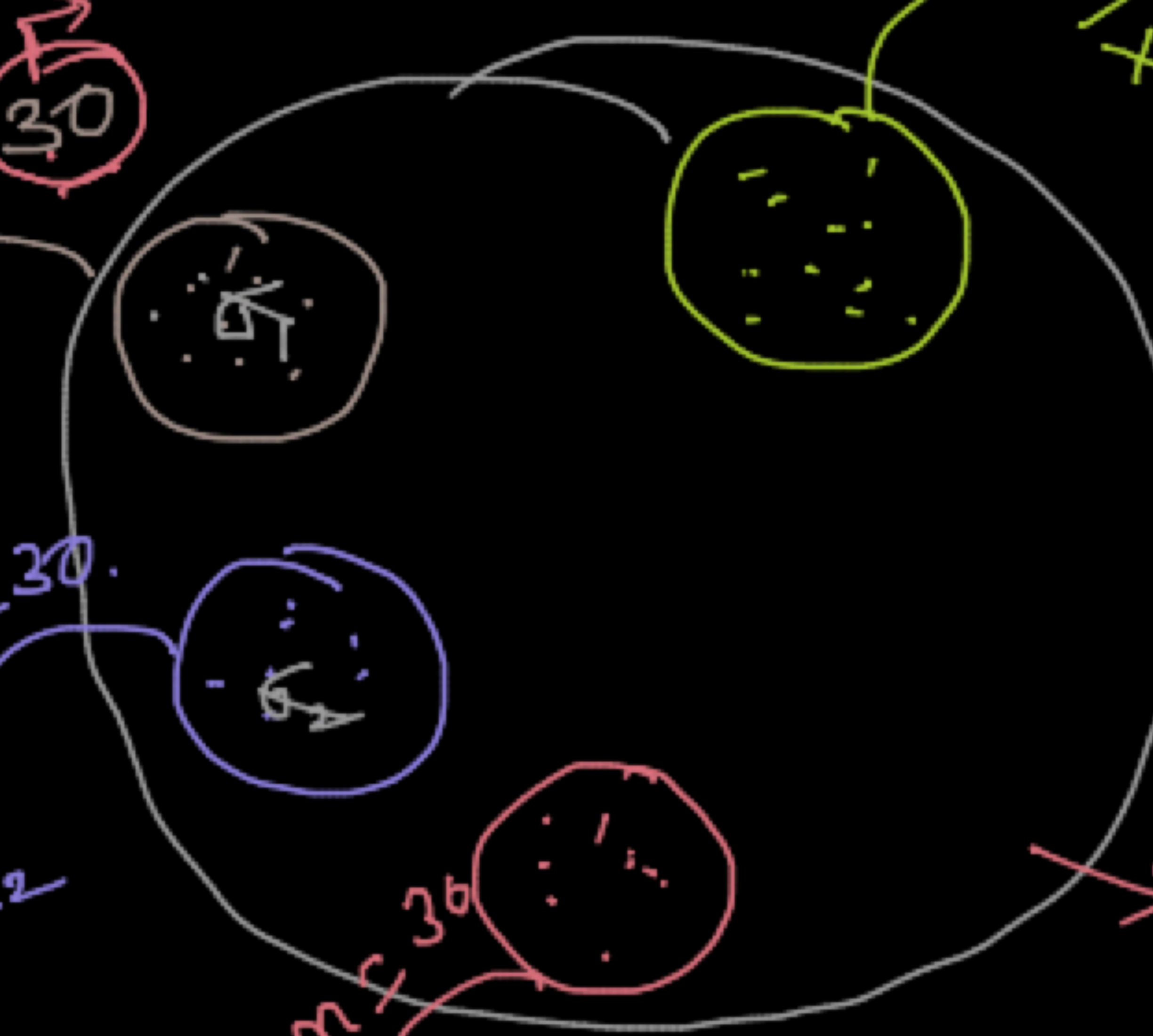
$= \sigma_{pop} / \sqrt{n}$

$\mu_{pop} =$

Sampling distribution of Sample means

100

$n = 30$



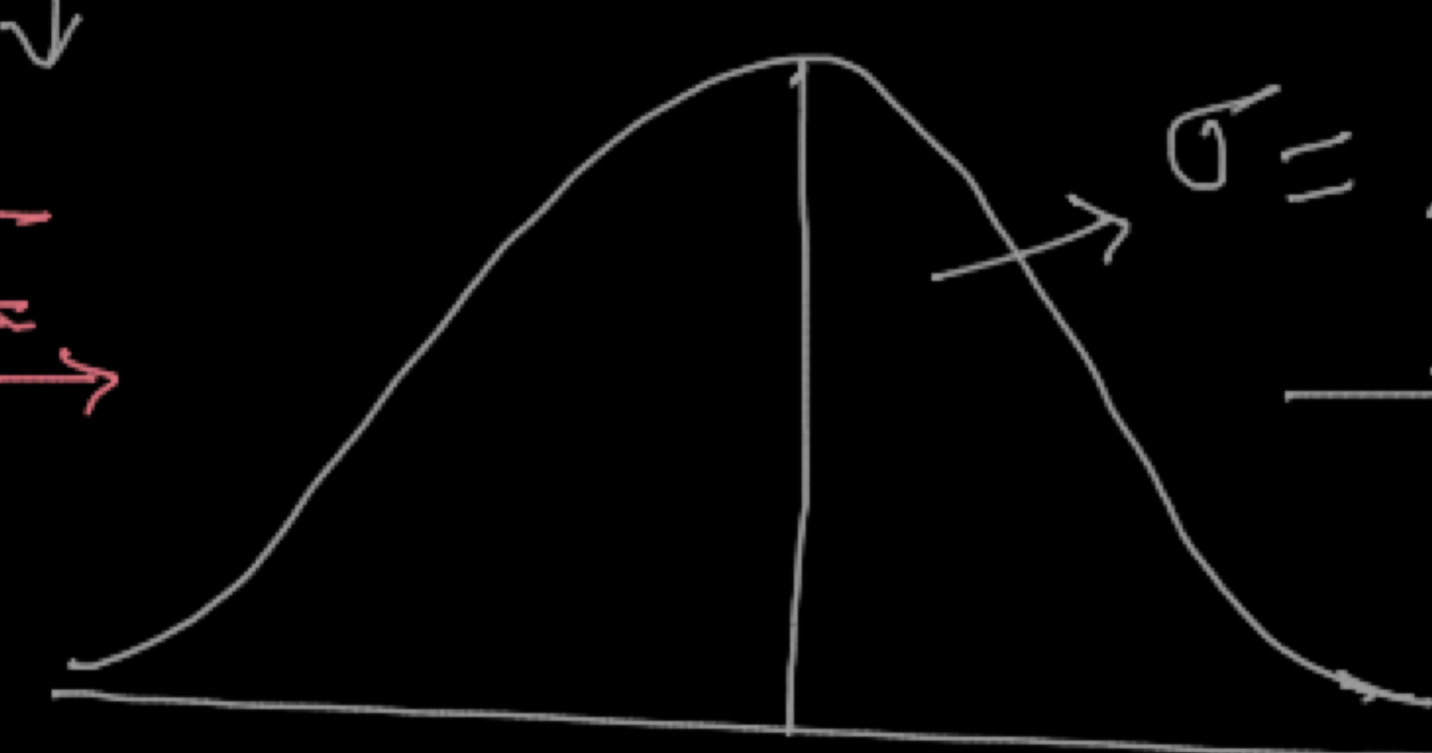
$n = 30$ S_{1000} $\bar{x}_{1000}$

S1 $\bar{x}_1$

$n = 30$ S2 $\bar{x}_2$

$n = 30$ S3 $\bar{x}_3$

$n \rightarrow$ sample Size.



$\bar{x}$

μ_{pop}

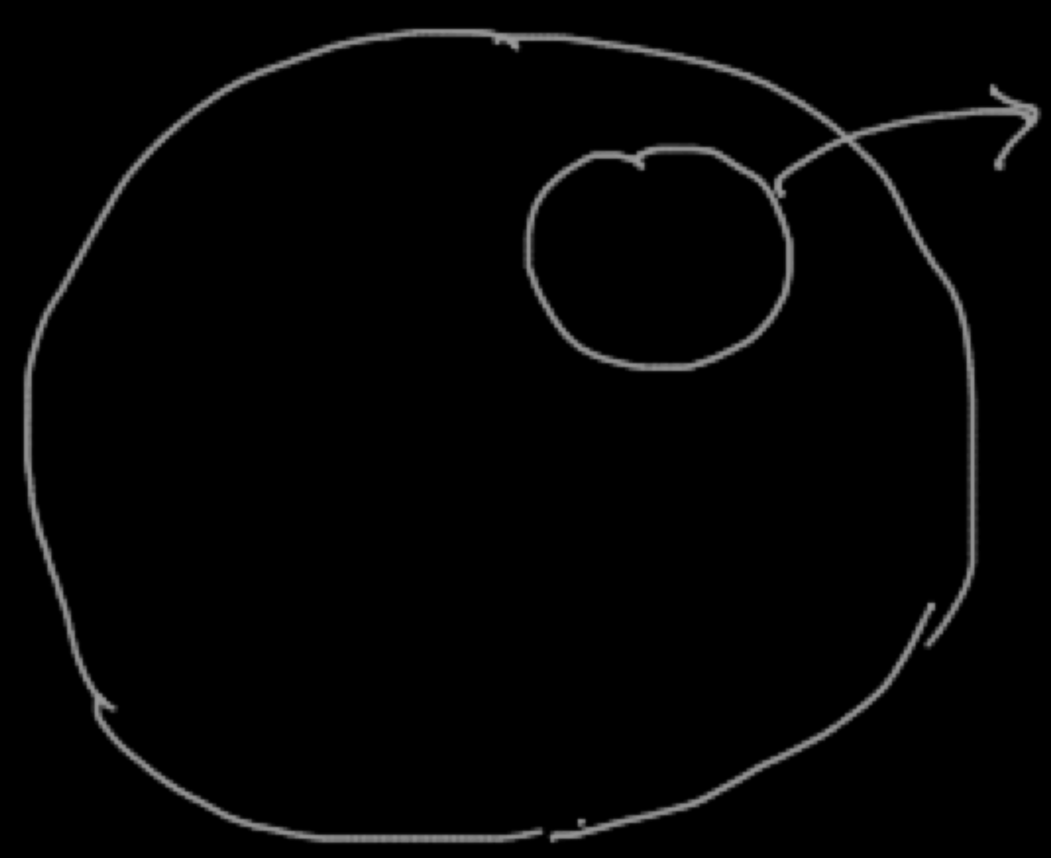
Dist of Sampl

$\sigma = \sigma_{pop} / \sqrt{n}$

Always Normally distributed.

30,000

100,000



$\bar{x} =$

Point Estimate.

Avg. Income $= \bar{x}$

Avg Income $= \bar{x} \pm \Delta \rightarrow ?$

↳ Range Estimate.

Confidence Level

28.3 — 10%. ✓

26 |——| 29 → 40%. ✓

20 |————| 40 → 80%. ✓

0 |——————| 100 → 100%. ✓

90% → C (0.90).

95% → (0.95)

98% → (0.98).

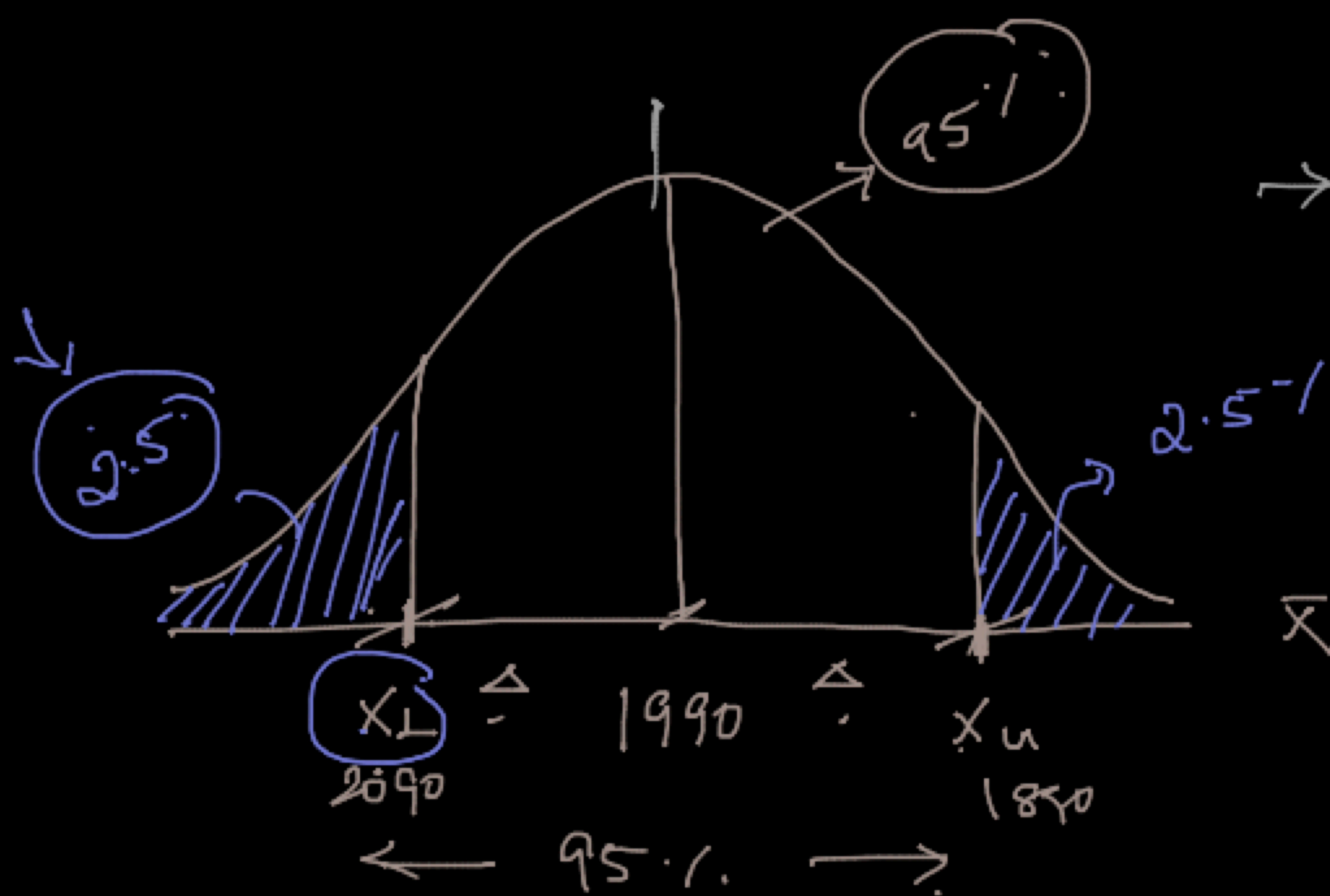
$\alpha \rightarrow$ Significance.

$\alpha = 1 - c$.

$\alpha = 1 - 0.95$

$= 0.05$

$$\Delta = Z_{\alpha/2} \cdot \frac{\sigma_{pop}}{\sqrt{n}}$$



$\alpha = 1 - C$

$\bar{x} \pm \Delta$

→ Confidence level = 95%

$C = (0.95)$ $\quad \alpha = 0.05$

$\alpha/2 = 0.025$

$\bar{x} + \Delta, \quad \bar{x} - \Delta$

$(1990 + 100, \; 1990 - 100)$

$(2090, \; 1890)$

Range Estimate $= \bar{x} \pm \Delta$

$= \left[1990 \pm 1.96 \cdot \frac{2500}{\sqrt{140}}\right] \rightarrow [1576, \; 2404]$

95%

Standardize

$\Delta = (z_{\alpha/2}) \frac{\sigma_{pop}}{\sqrt{n}}$

$\Delta = \pm 1.96 \cdot \frac{\sigma_{pop}}{\sqrt{n}}$

$= \pm 1.96 \times \frac{2500}{\sqrt{140}}$

$= \pm 414$

$C = 0.95$

$\alpha = 1 - 0.95$

$= 0.05$

$\alpha/2 = 0.025$

$= z_{\alpha/2}$