CLT (Central Limit Theorum)

$$\sigma_m = \frac{\sigma_{pop}}{\sqrt{n}}$$

n : sample size

$\mu = 65$

$\sigma_{pop} = 2.5$

50 samples : $\frac{2.5}{\sqrt{50}}$

5 samplees : $\frac{2.5}{\sqrt{5}}$

2000 retail chains

1800 shampoo bottles.

$\mu = 1800$

$sd = \underline{100}$

Marketing teams ??

Marketing A

[50 stores]

1850

Marketing B

5 stores

1900

can be made.

Based on above no decision ca...

Firm A

$H_0 : \mu = 1800$

$H_a : \mu > 1800$

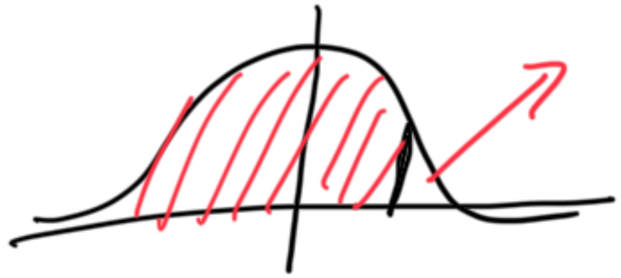
Hypothesis

distribution (m) $\rightarrow$ gaussian (CLT)

$\mu_m = 1800$

$\sigma_m = 100/\sqrt{50}$

p- value :



$1 - \text{norm.cdf}(z)$

$$Z = \frac{obs - \mu_m}{\sigma_m}$$

Z-statistic

$$= \frac{1850 - 1800}{100/\sqrt{50}}$$

$\boxed{\text{Z-test}}$

check if its significant.

Critical value

What should be min sales for 50 stores of firm A, so that we are convinced that +ve effect, with C.L : 99%

$\alpha = 0.01$

p-value cannot be more than 0.01

$$\text{p.value} = 1 - \text{norm.cdf}(Z) \quad \{\text{right-tailed}\}$$

$\text{norm.cdf}(Z)$

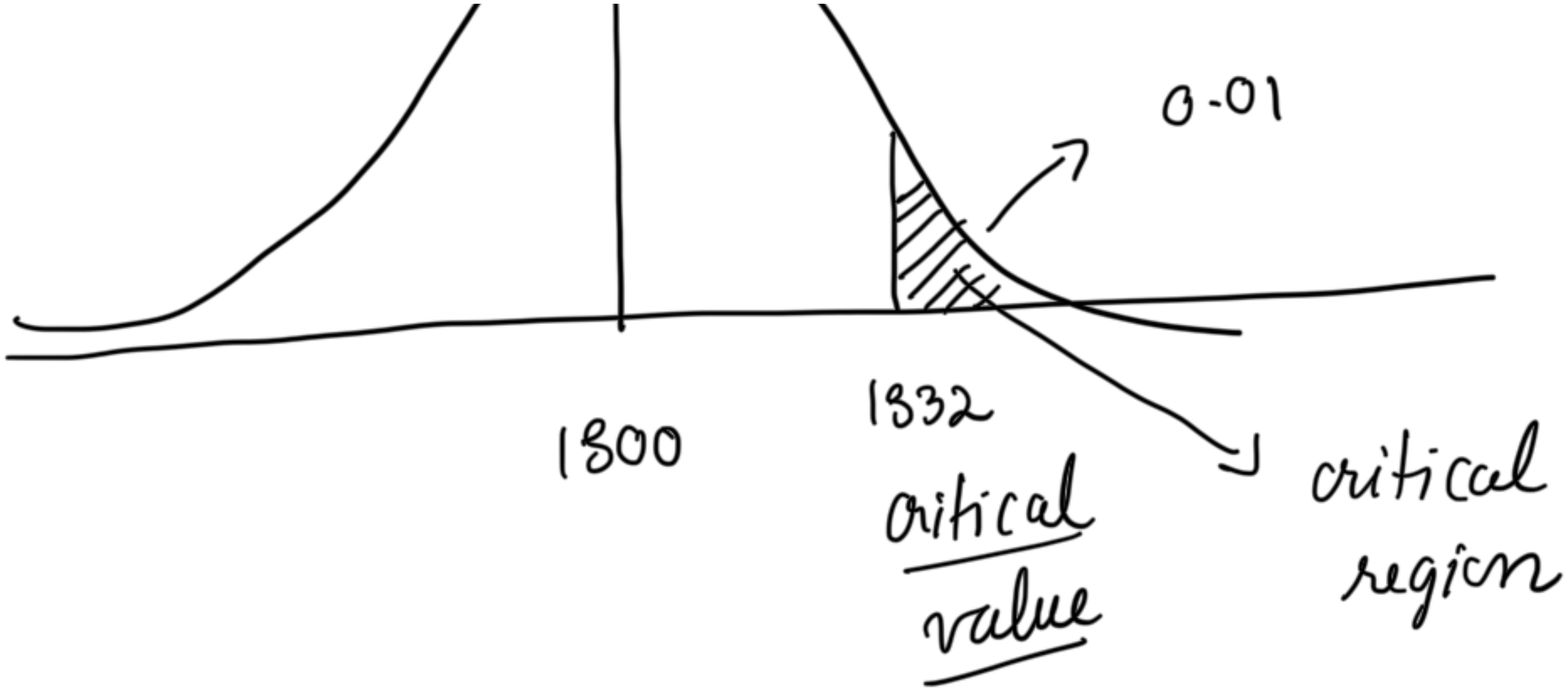
$0.01 = 1 - \text{norm.cdf}($

$$\text{norm.cdf}(z) = 0.99$$

$$z = \text{norm.ppf}(0.99)$$

$$z = \frac{x - \mu_m}{\sigma_m}$$

$$x = \underline{z \times \sigma_m} + \mu_m$$



1850 50

100

$\alpha = 0.01$

$\downarrow$

$CI = 1 - 0.01 = 0.99$

Margin of Error

↓

z - value at critical point