Basic Ideas of Sampling

Confidence Interval

Case I : 500 — 9000 → (900, 9100)

Case II : 100 — 8800 → (8200, 9400)

1. Population (Sometimes, it is not even observable and only abstract)
2. Sampling Frame (if you are lucky, you might get this, not guaranteed in most practical situations)
3. Subject
4. Parameter(Constant - might be unknown)
5. Statistic (Random Variable)

Central Limit Theorem

$\mu = \frac{A_1 + A_2 + \cdots + A_N}{N}$

A_1
A_2
$\vdots$
A_N

Theorem

If the sample size is large, for WITH REPLACEMENT and independent sampling, the sample mean $\overline{X}$ is approximately normal with

1. *mean* $= \mu$
2. *variance* $= \frac{\sigma^2}{n}$

What is meant by large n? Typically, $n \geq 30$

x_1
x_2
$\vdots$
x_{500}

$\overline{X} = \frac{x_1 + x_2 + \cdots + x_{500}}{500}$