11/15/23

$\mu = 22$ years

$\sigma = 3$

(1) life exp. $X =$

$P(19 \le X \le 23) \Rightarrow \frac{19-22}{3} \Rightarrow -1 \Rightarrow 15.86\%$

$\frac{23-22}{3} = \frac{1}{3} \Rightarrow 62.93\%$

$\Rightarrow 47\%$

(2)

$P(X = \_\_) > 0.9$

$-1.28 = \frac{x-22}{3} \Rightarrow x = 18.72$

Population parameters

approx

Sample statistics

sample mean $\bar{x}$

sample std dev S

Parameters

mean / expected μ

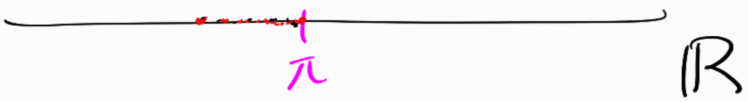
• Me... value

• std dev σ

• pick samples that reduce **bias**

Central Limit Theorem

• convergence = limit exists and you achieve limit.



$\boxed{\text{pointwise convergence}}$ $\Longrightarrow$ you converge to a point at every point....

Limiting function

Dirac "The Rock" Delta

Central Limit Theorem

① ... to sample of

Population

① Create sample of size N

② compute sample mean $\bar{x}$

means

create

③ Repeat steps 1 & 2 w/ possible sample of size N

④ collect all possible results ... this will be a distribution

"sampling distribution of sample means"

CLT

"Sampling dist. of sample means" is approx **Normal**

μ(sample dist. of means) $= \mu$

from pop.

μ (sample dist of sample ...

σ (sample dist of sample means) $= \dfrac{\sigma}{\sqrt{N}}$

N = sample size

- $N \geq 30$, $N < 0.1$ population size

Q3 $\mu = 22$ still

$\sigma = \dfrac{3}{\sqrt{40}}$

in sample... Prob(19 < life exp < 23)

$\dfrac{19-22}{} = z$

$3/\sqrt{40}$

Sample mean: $X_1, X_2, \ldots, X_n \leftarrow$ R.V.

$$\bar{X} = \frac{1}{n}(X_1 + X_2 + \cdots + X_n)$$

this is a R.V. itself!!

result: for Fri $\bar{X}$ is unbiased estimator for μ.

sampling dist (for a statistic)

① all possible samples of some size

② measure the statistic

③ throw results into data set.