§ 8.3 TYPES OF ESTIMATORS

POPULATION PARAMETERS (μ, p, σ) USUALLY UNKNOWN, SO WE USE SAMPLE STATISTICS AS POINT ESTIMATES $(\bar{x}, \hat{p}, s)$ OR AS INTERVAL ESTIMATES $(\bar{x} \pm \varepsilon, \hat{p} \pm \varepsilon)$.

POP. PARAM. ARE APPROX. EQUAL TO THESE POINTS

CONFIDENT THAT POP. PARAM. LIE IN THESE INTERVALS

§ 8.4 POINT ESTIMATION

DEF: AN ESTIMATOR OF A PARAMETER IS UNBIASED IF MEAN OF ITS (SAMPLE) DISTRIBUTION IS SAME AS TRUE VALUE OF PARAMETER. OTHERWISE UNBIASED

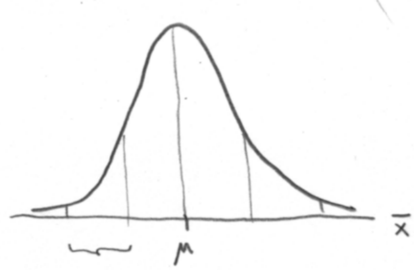
WE WANT TO USE UNBIASED ESTIMATORS. PREFERABLY WITH SMALL VARIANCE.

(CLT SAYS SAMPLE MEAN $\bar{X}$ IS DISTRIBUTION WITH SAME MEAN AS POPULATION!)

e.g. $n = 100$

$\bar{x} = 18$

$s = 5$



$$\frac{\sigma}{\sqrt{n}} \approx \frac{s}{\sqrt{n}} = .5$$

ESTIMATE $\mu \approx 18$

DEF. DISTANCE BETWEEN ESTIMATE AND PARAMETER IS CALLED ERROR OF ESTIMATION.

UNBIASED ESTIMATORS LIE WITHIN $\underbrace{1.96 \times SE}_{\text{MARGIN OF ERROR}}$ 95% OF THE TIME

POPULATION MEAN $\mu \approx \bar{x}$

HAS S.E. $= \frac{\sigma}{\sqrt{n}} \approx \frac{s}{\sqrt{n}}$

95% MARGIN OF ERROR $\pm 1.96 \left(\frac{s}{\sqrt{n}} \right)$

$n \geq 30$

POPULATION PROPORTION $p \approx \hat{p}$

HAS S.E $= \sqrt{\frac{pq}{n}} \approx \sqrt{\frac{\hat{p}\hat{q}}{n}}$

95% MARGIN OF ERROR $\pm 1.96 \sqrt{\frac{\hat{p}\hat{q}}{n}}$

$n\hat{p} > 5$

$n\hat{q} > 5$

ex. 8.12 8.21

8.13 8.22