**AP Test Review – Sampling Distributions**

I. General Features of Sampling Distributions

A. Parameter

a) describes population

b) common examples: µ, p, σ, β, y

B. Statistic

a) describes a sample

b) common examples: , , s, b,

C. Population Distribution vs. Sample Distribution

D. Variability and bias

When thinking about variability and bias, this of our 4 “bullseye” drawings.

a) want low variability

b) want low bias, so we use unbiased estimators

II. Sample Proportions

A. Mean of

a)

b) unbiased estimator

B. Standard Deviation of

a)

b) need to check 10% condition

c) as n gets larger, the standard deviation decreases

C. Normal Approximation

a) check if large counts is met: np ≥ 10 and n(1-p) ≥ 10

b) if large counts checks, the sampling distribution of will follow the N(p, )

III. Sample Means

A. Mean of

a)

b) unbiased estimator

B. Standard deviation of

a)

b) need to check 10% condition

c) as n gets larger, the standard deviation decreases

C. Normal Approximation

a) if the population distribution is Normal, then the sampling distribution of follows the N(µ, )

Central Limit Theorem: Using an SRS of size n with mean µ and standard deviation σ, when n is large, the sampling distribution of is approximately Normal

b) if not, check the Central Limit Theorem (n≥30)

c) then follow the N(µ, )

Tips and Common Mistakes:

* When using parameters, say “true mean” or “population mean”, etc.
* Be careful to distinguish between sampling distribution and distribution of a sample
* Large samples reduce variability, but do not reduce/eliminate bias
* Watch out for your use of variables, i.e. as statistic vs. parameter
* CLT refers to **shape** of the distribution, and does not reduce variability