Math 122
Introduction to Statistics
Sampling

Simple Random Sample: A simple random sample of n subjects is a sample which is collected in such a way that every *possible sample of the same size* n has the same chance of being selected.

Example: To get a simple random sample of 40 students on a college campus, we could randomly select 40 names from a directory.

Random Sample: A random sample of n subjects is a sample which is collected in such a way that every *individual* has the same chance of being selected.

Example: To get a random sample of 40 students on a college campus, we could randomly select 10 freshmen, 10 sophomores, 10 juniors, and 10 seniors. This could not be a simple random sample, because it would be impossible to select a sample with 20 freshmen.

When is a sample not a simple random sample? To determine if a random sample is or is not a simple random sample, ask if there are certain combinations which are not possible or which are more or less likely than others.

Example: If a sample is to be formed by randomly selecting two males and two females, then the sample cannot be a simple random sample because some combinations are not possible. It would not be possible, for example, to have all males in the sample.

Self-Selected Sample: A self-selected sample or voluntary response sample is a sample in which individuals decide themselves if they want to be part of the sample. This is about the worst type of sample that can be used for statistics.

Example: Phone-in surveys or optional surveys on web pages.

Convenience Sampling: In convenience sampling, data is collected from a sample that is easy to get without attention to how random the sample is.

Example: To guage student opinions on campus, a professor might survey one of his own classes rather than collecting a sample from the entire campus.

Systematic Sampling: In systematic sampling, subjects are arranged in some order. A starting place is randomly selected, and every k^{th} subject after that starting place is selected. This will give a random sample (but not a simple random sample).

Example: To collect a systematic sample of his students, a professor might select every fifth student on his roster.

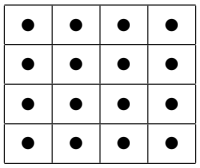
Stratified Sampling: In stratified sample, the subjects being studied are separated into levels, and a fixed number are selected from each level.

Example: To construct a stratified sample of the campus, we could collect twenty freshmen, twenty sophomores, twenty juniors, and twenty seniors.

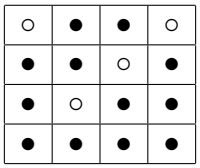
Cluster Sampling: In cluster sampling, the subjects being studied are separated into groups or clusters. Then, entire clusters are selected to be in the sample.

Example: To construct a cluster sample of students who live on campus, we could randomly select five dorm floors and survey every student on each of these floors.

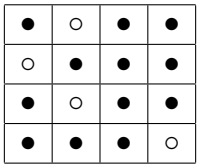
Example: Consider this collection of sixteen "dots" arranged in four rows:



To form a systematic sample of 4 of these dots, we could randomly select a dot – say the first in the first row – and then select every third dot after that one. This would give the following sample:



To form a stratified sample of 4 of these dots, we might randomly select a dot from each row such as:



To form a cluster sample of 4 of these dots, we might just randomly select a row: