2.3 Worksheet - Collecting Samples

MDM4U
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1) Identify the type of random sampling in each of the following scenarios.

a) The principal randomly selects four classes and surveys each student in those classes

Cluster random sampling

b) William picks names out of a hat

Simple random sampling

c) A hockey card collector opens a drawer of sorted cards and, after selecting a random starting point, takes out every fifth card.

Systematic random sampling

d) The Ministry of Education randomly selects your school for testing, and 40 student names are randomly selected from a student list.

Multi-stage random sampling

e) Your class submits solutions to a problem and your teacher divides the work into four piles by achievement levels. She then randomly picks three examples from each.

Stratified random sampling

f) A farmer brings a juice company several crates of oranges each week. A company inspector looks at 10 oranges from the top of each crate before deciding whether to buy all the oranges.

Convenience non-random sampling

g) The ABC program Nightline once asked whether the United Nations should continue to have its headquarters in the United States. Viewers were invited to call one telephone number to respond 'yes' and another for 'no.' More than 186 000 callers responded.

Voluntary non-random sampling

2) A textbook has 600 pages and 6 chapters. Describe how to you could design and carry out the following samples of its pages.

a) Select 6 pages from the textbook using simple random sampling

Use randint(1, 600, 6) to randomly select 6 pages.

b) Select 10 pages using systematic random sampling

select random starting point using randint(1, 600, 1) and then select every 60th page (sampling interval = 600/10 = 60)

c) Select 12 pages using stratified random sampling

Divide pages into groups based on chapters. Take a simple random sample of 2% (12/600 = 0.02) of the pages from each chapter.

d) Select 10 pages using multi-stage random sampling.

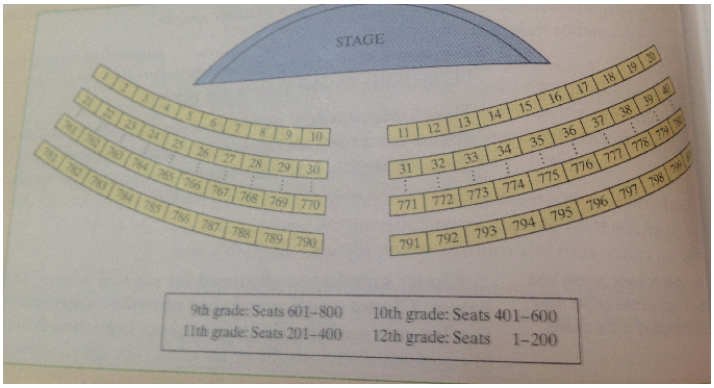
Divide pages into groups based on chapter. Do a simple random sample of chapters and then do a simple random sample of the pages within the chosen chapters.

3) Based on the following groups of names, identify a sampling method that may have been used to collect the samples listed in parts (a) through (e).

Shaggy	Paul	Joey	Susan
Fred	John	Monica	Elmo
Scooby	George	Rachel	Ernie
Thelma	Ringo	Ross	Oscar
Daphne		Chandler	Zoe
		Phoebe	Maria

a) Joey, Monica, Fred, Paul, Daphne — *SIMPLE*
b) Susan, Elmo, Ernie, Oscar, Zoe, Maria — *CLUSTER*
c) Shaggy Scooby, Daphne — *SYSTEMATIC*
d) John, George, Ringo — *MULTI-STAGE*
e) Shaggy, Fred, George, John, Joey, Chandler, Susan, Ernie — *STRATIFIED*

4) Student council wants to conduct a survey during the first five minutes of an assembly. There are 800 students at the assembly. A map of the auditorium is shown below. Note that the students are seated by grade level and the seats are numbered from 1 to 800. Describe how you would use your calculatr to select 80 students to complete the survey with each of the following methods:



a) Simple Random Sample

Use randint(1, 800, 80) to choose which students to give the survey to.

b) Stratified Random Sample

Use the grade levels at the strata. Within each grade's seating area, we'll select 10% (20) of the seats.
For 9th grade use randint(601, 800, 20)
For 10th grade use randint(401, 600, 20)
For 11th grade use randint(201, 400, 20)
For 12th grade use randint(1, 200, 20)

c) Cluster Random Sample

When using cluster random sampling, it is best if each cluster has the same characteristics as the population. For this reason, it would be best to use each column of seats as a cluster because that will ensure there are students of each grade level in each cluster. Because there are 20 columns (clusters), each with 40 seats, we need to randomly choose 2 clusters to get our sample of 80. Use randint(1, 20, 2) to select two clusters and then give the surveys to ALL of the students in those clusters.

d) Systematic Random Sample

Use randint(1, 800, 1) to determine a random starting point. Then give the survey to every 10th student (sampling interval = 800/80).