

## AP Statistics

### Chapter 4: Designing Studies

#### Day 3

HW: p. 226-230, #11, 16, 19, 39

p. 226-230, #1, 3, 21, 38, 40

1. The population is (all) local businesses. The sample is the 73 businesses that return the Questionnaire.
3. The population is the 1000 envelopes stuffed during a given hour. The sample is the 40 envelopes selected.
21.
  - (a) Use the three types of seats (sideline, corner and end zone) as the three strata since ticket prices be similar within each stratum but different between the three strata.
  - (b) It might be easier to obtain a cluster sample because a stratified random sample will still likely seats all over the stadium, which would make it very time consuming to get to everyone. A cluster sample would be easier to obtain, because there would be many people sitting all together who be part of the sample. In this case one would use the section numbers for the clusters.
38. d
40. c

### Sampling with Random Digit Table

A **random digit table** can be used to select a random sample from a population.

Each member of the population is assigned an identification number, with the length of the number in digits determined by the size of the population.

### Sampling with Random Digit Table

- 1 2 3 ..... 0
- For populations of 10 or less, one digit is needed.  
1-9 and 0 "the 10<sup>th</sup> person"
- Populations of 11-100 require two-digit numbers.  
01-99 and 00 "the 100<sup>th</sup> person"
- Three digits are required for populations of size 101-1000, and so on.  
001-999 and 000 "the 1000<sup>th</sup> person"
- NOTE:** If you have 100 individuals in a population, assigning 01-100 is not correct.  
001-200
- The number 100 has three digits and all of the others from 01 to 99 have two digits.
  - However, 00 is a two-digit number that will work for 100.

## Sampling with Random Digit Table

Random numbers of the same length are selected from the random digit table by reading across the lines of the table.

Each consecutive group of digits will either select one of the individuals in the population, or be ignored because it has already been selected, if sampling without replacement, or because it does not correspond with any member of the population.

23 → 01 to 23

## Example: Random Digit Table

Select a simple random sample of sample size  $n = 6$  from the population of names below using the random digit table provided. 01-20

Anita 01	Billy 05	Carol 09	Doug 13	Elmer 17
Francine 02	Glenda 06	Hector 10	Ivy 14	Jose 18
Kelly 03	Lynn 07	Melvin 11	Nicole 15	Olive 19
Paul 04	Quincy 08	Rae 12	Sue 16	Tom 20
A I 01401	D 49913	T 2034	H 96010	
S 16290				
	33843	95945	04834	

## Example: Random Digit Table

Explain how you would assign labels to this sample of names.

Assigned two-digits to each person using digits 01 to 20. Skip digits 21-99 and 00.

## Example: Random Digit Table

How will you use the table to determine which numbers are selected?

Used the first line, we found two-digit numbers and stopped when we found 6 different names. The six people I picked were Anita, Ivy, Doug, Tom, Hector and Sue.

## Random Digit Table (Textbook - Table D)

Line	1	2	3	4	5	6	7	8	9
101	19223	95034	05756	28713	96409	12531	42544	82853	
102	73676	47150	99400	01927	27754	42648	82425	36290	
103	45467	71709	77558	00095	32863	29485	82226	90056	
104	52711	38889	93074	60227	40011	85848	48767	52573	
105	95592	94007	69971	91481	60779	53791	17297	59335	
106	68417	35013	15529	72765	85089	57067	50211	47487	
107	82739	57890	20807	47511	81676	55300	94383	14893	
108	60940	72024	17868	24943	61790	90656	87964	18883	
109	36009	19365	15412	39638	85453	46816	83485	41979	
110	38448	48789	18338	24697	39364	42006	76688	08708	
111	81486	69487	60513	09297	00412	71238	27649	39950	
112	59636	88804	04634	71197	19352	73089	84898	45785	
113	62568	70206	40325	03699	71080	22553	11486	11776	
114	45149	32992	75730	66280	03819	56202	02938	70915	
115	61041	77684	94322	24709	73698	14526	31893	32592	

A club has 30 student members and 10 faculty members. The faculty members are:

01 Andrews 02 Fernandez 03 Kim 04 Moore 05 Rabinowitz  
06 Besicovich 07 Gupta 08 Lightman 09 Phillips 10 Yang

and the students are:

11 Abel 12 Fisher 13 Huber 14 Moran 15 Reisman  
16 Carson 17 Golomb 18 Jimenez 19 Moskowitz 20 Santos  
21 Chen 22 Griswold 23 Jones 24 Neyman 25 Shaw  
26 David 27 Han 28 Kiefer 29 O'Brien 30 Thompson  
31 Deming 32 Hernandez 33 Katz 34 Pearl 35 Uts 36 Uts  
37 Elshoff 38 Holland 39 Liu 40 Potter 41 Vlack

1. The club can send six people to a convention and decides to choose who will go by random selection. Use the Random Digit Table to choose a simple random sample of 6 people. Explain how you would assign labels to the faculty members and students, and how you would use the table to determine who will go to the convention. Enter the table at line 101.

Line:

101 05007 16632 81194 14873 04397 85576 45195 96685  
102 68732 55259 84292 08796 43165 93739 31885 97150  
103 45149 32992 75730 66280 03819 56202 02938 70915  
104 27816 78416 18329 23337 35213 37461 04312 68508

Assign each faculty member a two-digit label from 00 to 09 and each student a two-digit label from 10 to 39. Skip digits 40 to 99. Go to line 101 and record the two-digits until 6 different people are chosen. The faculty members chosen to go to the convention are Andrews, Kim and Lightman (00, 04, 05). The students chosen are Hein, Kiefer and Pearl (19, 25, 30).

2. The parents of the students decided that they wanted two faculty members to go to the convention. Use the Random Digit Table to choose a stratified random sample consisting of 2 faculty members and 4 students. Explain how you would assign labels to the faculty members and students, and how you would use random digits to determine who will go to the convention. Enter at line 101 for the faculty members and enter at line 104 for the students.

A club has 30 student members and 10 faculty members. The faculty members are:

0 Andrews 1 Fernandez 2 Kim 3 Moore 4 Rabinowitz  
5 Besicovich 6 Gupta 7 Lightman 8 Phillips 9 Yang

and the students are:

10 Abel 11 Fisher 12 Huber 13 Moran 14 Reisman  
15 Carson 16 Golomb 17 Jimenez 18 Moskowitz 19 Santos  
20 Chen 21 Griswold 22 Jones 23 Neyman 24 Shaw  
25 David 26 Han 27 Kiefer 28 O'Brien 29 Thompson  
30 Deming 31 Hernandez 32 Katz 33 Pearl 34 Uts 35 Uts  
36 Elshoff 37 Holland 38 Liu 39 Potter 40 Vlack

Line:

101 05007 16632 81194 14873 04397 85576 45195 96685  
102 68732 55259 84292 08796 43165 93739 31885 97150  
103 45149 32992 75730 66280 03819 56202 02938 70915  
104 27816 78416 18329 23337 35213 37461 04312 68508

Assign each faculty member a single digit label. Select a single digit from line 103 on the random digit table until two different faculty members are chosen. The faculty members chosen to go are Kim and Lightman (4, 5).

Assign a two-digit label from 10 to 39 as done in Part A. Select groups of two-digits from line 104 on the random digit table until four different students are chosen. Skip digits 40 to 99. The four students chosen to go are Fisher, Griswold, Liu, and Pearl (16, 19, 27, 30).