Simple Random Sampling with Table D

AP Statistics Worksheet · Grade 10–12

Name: _____ Date: _____

Learning Objectives

- Understand how Table D generates random digits and how to read it correctly
- Assign numerical labels to a population and apply a stopping rule to select an SRS
- Identify and skip invalid numbers (out of range or repeated) when using Table D

Problems

1. Table D is a table of random digits. What is the range of digits that can appear in Table D, and how are the digits grouped?

2. A researcher has a population of 8 people. She wants to label each person with a single-digit number for use with Table D. What labels should she assign, and why is only one digit per person appropriate here?

3. A teacher has a class of 40 students. Explain how you would assign numerical labels to these students so that every label has the same number of digits.

4. The following digits appear on line 101 of Table D. Reading the digits in pairs from left to right, list the first six two-digit numbers you would read. The digits on line 101 are: 1 9 2 2 3 9 4 4 4 7 5 2.

19 22 39 44 47 52

5. A survey selects an SRS from a population of 28 hotels, labeled 01 to 28. The following two-digit numbers were read from Table D in order: 69, 05, 16, 48, 17, 87, 17, 40, 95. Which numbers are selected (used), which are skipped because they are too high, and which are skipped because they repeat?

6. Look at the table below showing a portion of Table D. The population has 15 members labeled 01 to 15. Starting at the beginning of the row shown, read two-digit numbers from left to right and list the first three valid selections (no repeats, within range). Then identify which two-digit numbers were skipped and why.

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Group 1	Group 2	Group 3	Group 4	Group 5
38277	59580	10479	01011	74945

7. A school has 130 students. A researcher wants to select an SRS of 10 students using Table D. How many digits should each label have? Write out what the first label and the last label would look like.

8. The five steps to generating a simple random sample using Table D are listed below but scrambled. Put them in the correct order by writing the step numbers 1 through 5.

Scrambled Step	Your Order (1–5)
Use Table D and simulate	
Identify the selected individuals	
Assign numerical labels	
State that you are randomized / done	
Create a stopping rule	

9. A newspaper editor has a list of 28 hotels labeled 01 through 28. She uses line 130 of Table D and reads the following consecutive two-digit values: 69, 05, 16, 48, 17, 87, 17, 40, 95, 17, 84, 53, 22, 03, 20. She needs to select exactly 4 hotels. Complete the table below by marking each number as Selected, Skip-High, or Skip-Repeat, and identify the four winning hotel numbers.

Two-digit number	Action (Selected / Skip-High / Skip-Repeat)
69	
05	
16	
48	
17	
87	
17 (2nd)	
40	

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Two-digit number	Action (Selected / Skip-High / Skip-Repeat)
95	
17 (3rd)	
84	
53	
22	
03	
20	

10. Using the results from the hotel selection problem (hotels 05, 16, 17, and 20 selected from a list of 28 hotels in alphabetical order), answer the following multi-part question: (a) If hotel number 05 is 'Beach Castle,' hotel 16 is 'Radisson,' hotel 17 is 'Ramada,' and hotel 20 is 'Sea Club,' name the four hotels selected. (b) Suppose the editor now wants to expand her sample to 6 hotels. After hotel 20 is selected, the next two-digit numbers read from Table D are: 28, 28, 07, 33, 07. Determine which two additional hotels are selected, clearly explaining each decision. (c) Why is it important that a repeated number is skipped rather than counted a second time?

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Simple Random Sampling with Table D — Answer Key

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Answer Key

1. Answer: Digits range from 0 to 9; they are grouped in sets of five.

- Table D contains single digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- These digits are arranged in groups of five across each row (line) of the table.

2. Answer: Labels 1 through 8 (or 0 through 7). One digit is appropriate because the population size is a single-digit number.

- The population has 8 members, which is a single-digit count.
- Assign labels 1, 2, 3, 4, 5, 6, 7, 8 — one digit each — so all labels have the same number of digits.
- Any digit read from Table D that falls between 1 and 8 selects that person; 0 and 9 are skipped.

3. Answer: Label the students 01 through 40 (two-digit labels).

- The population size is 40, which requires two digits (01–40).
- Assign 01 to the first student, 02 to the second, and so on up to 40.
- Using two-digit labels ensures fairness — every label has the same number of digits.

4. Answer: 19, 22, 39, 44, 47, 52

- Group the digits in pairs: (1,9), (2,2), (3,9), (4,4), (4,7), (5,2).
- The two-digit numbers are: 19, 22, 39, 44, 47, 52.

5. Answer: Selected: 05, 16, 17. Skipped (too high): 69, 48, 87, 40, 95. Skipped (repeat): second 17.

- Valid range is 01–28.
- 69 > 28 → skip (too high).
- 05 is between 01 and 28 → select.
- 16 is between 01 and 28 → select.
- 48 > 28 → skip (too high).
- 17 is between 01 and 28 → select.
- 87 > 28 → skip (too high).
- Second 17 already selected → skip (repeat).
- 40 > 28 → skip (too high).
- 95 > 28 → skip (too high).
- So far 3 hotels selected: 05, 16, 17.

6. Answer: Selected: 10, 14, 01. Skipped: 38, 27, 75, 95, 80 (too high); second 01 (repeat — but 11 is also skipped as too high).

- Read digits in pairs: 38, 27, 75, 95, 80, 10, 47, 90, 10, 11, 74, 94, 5 (need one more digit).
- Valid range: 01–15.
- 38 → skip (too high); 27 → skip; 75 → skip; 95 → skip; 80 → skip.

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- 10 → select (first pick).
- 47 → skip; 90 → skip.
- Re-reading: next pair is 14 from '10479' → select (second pick).
- Then '01' from '01011' → select (third pick).
- Three selections: 10, 14, 01.

7. Answer: Three-digit labels; first label: 001, last label: 130.

- The population has 130 students, which is a three-digit number.
- Therefore each label needs 3 digits so all labels have the same number of digits.
- First label: 001, last label: 130.
- When reading Table D, group digits in threes and skip any three-digit number outside 001–130 or that repeats.

8. Answer: 1: Assign numerical labels, 2: Use Table D and simulate, 3: Create a stopping rule, 4: Identify the selected individuals, 5: State that you are randomized / done.

Scrambled Step	Your Order (1–5)
Use Table D and simulate	2
Identify the selected individuals	4
Assign numerical labels	1
State that you are randomized / done	5
Create a stopping rule	3

- Step 1: Assign numerical labels with the same number of digits to each member of the population.
- Step 2: Use Table D to simulate random selection.
- Step 3: Create a stopping rule (e.g., stop after selecting n individuals).
- Step 4: Identify the selected individuals from the labels chosen.
- Step 5: State that you have successfully randomized your sample.

9. Answer: Four selected hotels: 05, 16, 17, 20.

Two-digit number	Action (Selected / Skip-High / Skip-Repeat)
69	Skip-High
05	Selected
16	Selected
48	Skip-High
17	Selected
87	Skip-High
17 (2nd)	Skip-Repeat
40	Skip-High

Two-digit number	Action (Selected / Skip-High / Skip-Repeat)
95	Skip-High
17 (3rd)	Skip-Repeat
84	Skip-High
53	Skip-High
22	Skip — 4 already found before this
03	Skip — 4 already found before this
20	Selected (4th)

- Valid range: 01–28. Need 4 unique hotels.
- 69 > 28 → Skip-High.
- 05 is in 01–28, not yet chosen → Selected (1st).
- 16 is in 01–28, not yet chosen → Selected (2nd).
- 48 > 28 → Skip-High.
- 17 is in 01–28, not yet chosen → Selected (3rd).
- 87 > 28 → Skip-High.
- 17 already selected → Skip-Repeat.
- 40, 95 > 28 → Skip-High.
- 17 again → Skip-Repeat.
- 84, 53 > 28 → Skip-High.
- 20 is in 01–28, not yet chosen → Selected (4th). Done.
- Four hotels chosen: 05, 16, 17, 20.

10. Answer: (a) Beach Castle, Radisson, Ramada, Sea Club. (b) 28 is selected (5th); second 28 is skipped (repeat); 07 is selected (6th); 33 is skipped (too high); second 07 is skipped (repeat). Two additional hotels: 28 and 07. (c) Counting a repeat would mean the same hotel is called twice, violating the 'simple' in SRS — each unit can only appear once.

- Part (a): Hotel 05 = Beach Castle, 16 = Radisson, 17 = Ramada, 20 = Sea Club.
- Part (b): Already selected: 05, 16, 17, 20. Need 2 more.
- 28 is in range 01–28 and not yet chosen → Selected (5th hotel).
- Second 28 already selected → Skip-Repeat.
- 07 is in range 01–28 and not yet chosen → Selected (6th hotel). Done.
- 33 > 28 → Skip-High (but we already have 6, so we stop).
- Two additional hotels are 28 and 07.
- Part (c): Skipping repeats ensures each individual has an equal chance of appearing in the sample exactly once, which is the definition of an SRS. Allowing repeats would bias the sample and violate the randomness principle.

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