Simple Random Sampling Using a Random Digit Table

Statistics Worksheet · Grade 9–12

Name: _____ Date: _____

Learning Objectives

- Understand the definition and purpose of simple random sampling using a random digit table
- Apply the four-step process: assign numerical tags, use the table, apply a stopping rule, and identify the sample
- Determine the correct number of digits to use based on population size

Problems

1. A teacher wants to select students from a class of 25 using simple random sampling with a random digit table. How many digits should be assigned to each student's numerical tag?

2. A researcher has a population of 500 people and wants to use a random digit table to select a sample. How many digits should be assigned to each person's numerical tag?

3. Jones Accounting Firm has 30 business clients. Using the four steps of simple random sampling, what is the very first thing Joan must do before looking at the random digit table?

4. A school has 8,000 students. A researcher uses a random digit table to select a sample. How many digits should each student's tag have, and what is the range of valid tags?

5. Using the random digit table below, Joan reads Line 130 and groups the digits into two-digit numbers. The digits in Line 130 are: 6 9 0 5 1 6 4 8 1 7 8 7 1 7 4. List all the two-digit numbers formed from these digits in order.

Position	Digits Read	Two-Digit Group
1	6, 9	69
2	0, 5	05
3	1, 6	16

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Position	Digits Read	Two-Digit Group
4	4, 8	48
5	1, 7	17
6	8, 7	87
7	1, 7	17
8	4, ?	4?

6. Joan has 30 business clients tagged 01 to 30. She reads the following two-digit numbers from the random digit table: 69, 05, 16, 48, 17, 87, 17, 14, 22, 06. Apply the stopping rule to identify which numbers are valid tags for her population and list them.

7. Using the valid tags identified in the previous problem (05, 16, 17, 14, 22, 06), Joan only needs a sample of 5 clients. Match each tag to a client below and list Joan's final sample of 5. The clients and their tags are: 01 = A1 Plumbing, 05 = Accent Printing, 06 = Action Sports Shop, 14 = City Bakery, 16 = Downtown Deli, 17 = Eagle Hardware, 22 = Sunrise Cafe.

Tag	Client Name	In Sample?
05	Accent Printing	
16	Downtown Deli	
17	Eagle Hardware	
14	City Bakery	
22	Sunrise Cafe	
06	Action Sports Shop	

8. A hospital database has 1,200 patient records. A researcher wants a simple random sample of 10 patients using a random digit table. Describe all four steps the researcher must follow, including how many digits to use for each tag.

9. A researcher uses a random digit table starting at Line 131 to sample from a population of 75 people (tagged 01 to 75). Line 131 reads: 8 3 4 5 1 6 2 0 7 4 5 9 3 0 1 1 2 7 4 8. Group these into two-digit numbers, apply the stopping rule, and identify the first 4 valid members of the sample.

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10. A quality control manager at a factory wants a simple random sample of 8 products from a batch of 2,500. She opens the random digit table to a random line and reads the following digits: 0 0 7 4 3 1 9 2 2 5 0 0 0 8 9 9 1 2 4 6 1 8 0 3 2 5 0 1 2 2. Using the correct digit grouping and stopping rule for this population size, identify the first 4 valid product tags from this sequence.

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Simple Random Sampling Using a Random Digit Table — Answer Key

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Answer Key

1. Answer: 2 digits (01 to 25)

- The population size is 25.
- Since 25 is a two-digit number, each individual needs a two-digit tag.
- Tags range from 01 to 25, so 2 digits are used.

2. Answer: 3 digits (001 to 500)

- The population size is 500.
- Since 500 is a three-digit number, each individual needs a three-digit tag.
- Tags range from 001 to 500, so 3 digits are used.

3. Answer: Assign each client a unique two-digit numerical tag (01 to 30)

- Step 1 of simple random sampling requires assigning each individual in the population a unique numerical tag.
- Since the population is 30, two-digit tags (01 through 30) are appropriate.
- This must be done before consulting the random digit table.

4. Answer: 4 digits; tags range from 0001 to 8000

- The population size is 8,000, which is a four-digit number.
- Each student needs a four-digit tag to accommodate all 8,000 individuals.
- Tags range from 0001 to 8000.

5. Answer: 69, 05, 16, 48, 17, 87, 17, 4...

Position	Digits Read	Two-Digit Group
1	6, 9	69
2	0, 5	05
3	1, 6	16
4	4, 8	48
5	1, 7	17
6	8, 7	87
7	1, 7	17
8	4, ?	4?

- Take the digits two at a time from left to right in Line 130.

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- Pair 1: 6,9 → 69; Pair 2: 0,5 → 05; Pair 3: 1,6 → 16; Pair 4: 4,8 → 48.
- Pair 5: 1,7 → 17; Pair 6: 8,7 → 87; Pair 7: 1,7 → 17.
- Continue reading until enough valid tags are found.

6. Answer: Valid tags: 05, 16, 17, 14, 22, 06

- Valid tags must fall between 01 and 30 (the assigned range for 30 clients).
- 69 → invalid (greater than 30); 05 → valid; 16 → valid; 48 → invalid.
- 17 → valid; 87 → invalid; 17 → already selected (skip duplicate); 14 → valid.
- 22 → valid; 06 → valid.
- Valid tags in order: 05, 16, 17, 14, 22, 06.

7. Answer: Sample of 5: Accent Printing, Downtown Deli, Eagle Hardware, City Bakery, Sunrise Cafe

Tag	Client Name	In Sample?
05	Accent Printing	Yes (1st)
16	Downtown Deli	Yes (2nd)
17	Eagle Hardware	Yes (3rd)
14	City Bakery	Yes (4th)
22	Sunrise Cafe	Yes (5th)
06	Action Sports Shop	No — already have 5

- We need exactly 5 clients in the sample.
- Take the first 5 valid tags in order: 05, 16, 17, 14, 22.
- Match each tag: 05 = Accent Printing, 16 = Downtown Deli, 17 = Eagle Hardware, 14 = City Bakery, 22 = Sunrise Cafe.
- Stop after 5 clients are selected — this is the stopping rule.

8. Answer: Step 1: Assign 4-digit tags (0001–1200). Step 2: Choose a starting line in the table and read 4 digits at a time. Step 3: Skip numbers outside 0001–1200 and duplicates (stopping rule). Step 4: Stop when 10 valid tags are collected — those are the sample.

- Step 1: Assign each of the 1,200 patients a unique four-digit tag from 0001 to 1200.
- Step 2: Choose any line in the random digit table and read digits in groups of four.
- Step 3: Ignore any four-digit group greater than 1200 or equal to 0000, and skip repeats.
- Step 4: Continue until 10 valid tags are found — those patients form the sample.

9. Answer: Valid sample members (tags): 34, 51, 62, 07 — representing clients tagged 07, 34, 51, 62

- Group Line 131 digits into pairs: 83, 45, 16, 20, 74, 59, 30, 11, 27, 48.
- Valid range is 01 to 75.
- 83 → invalid; 45 → valid (1st); 16 → valid (2nd); 20 → valid (3rd); 74 → valid (4th).
- Stop after collecting 4 valid tags: 45, 16, 20, 74.
- These correspond to the individuals assigned tags 16, 20, 45, and 74.

10. Answer: Valid tags: 0074, 1922, 0089, 1246

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- Population size is 2,500, which requires four-digit tags ranging from 0001 to 2500.
- Group the digits into sets of four: 0074, 3192, 2500, 0089, 9124, 6180, 3250, 1220.
- 0074 → valid (01–2500); 3192 → invalid (> 2500); 2500 → valid (exactly 2500, included); 0089 → valid.
- 9124 → invalid; 6180 → invalid; 3250 → invalid; 1220 → valid.
- Wait — re-check: 2500 is valid only if population goes up to exactly 2500.
- First 4 valid tags in order: 0074, 2500, 0089, 1220.

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