INSTRUCTOR'S RESOURCE GUIDE
TO ACCOMPANY

AUDIT SAMPLING

AN INTRODUCTION

FIFTH EDITION

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Chapter I: Overview of Audit Sampling

Solutions to Review Questions

1-1. A. False

B. False

C. False

D. False

E. False

F. True

G. True

1-2. A. Sample items must be randomly selected.

B. Sample results must be mathematically evaluated.

1-3. Fixed sample-size attribute sampling

Sequential sampling

Discovery sampling

1-4. Unstratified mean-per-unit

Stratified mean-per-unit

Difference estimation

1-5. Cash disbursements test, sales test, detailed payroll test, cash receipts test.

1-6. Accounts receivable confirmation, inventory price test, expense tests, revenue tests.

1-7. Nonsampling error is controlled by proper engagement planning, supervision, and review.

1-8. By using statistical sampling the auditor can:

- Calculate sample reliability and risk of reliance on the sample.
- Optimize the sample size given the mathematically measured risk they are willing to accept.
- Objectively make statements about the population based on the sample results.
- Better plan an approach to the audit.

1-9.
- Population definition
- Population characteristics
- Deviation or misstatement definition
- Sampling plan
- Selection method
- Evaluation of results

1-10. The auditor can never eliminate nonsampling risk even if 100 percent of the items are audited. Very few audit procedures are conclusive; thus, most audit tests, even if properly applied, will not guarantee that all misstatements are discovered.

1-11. The first general standard ("adequate technical training and proficiency") and the three field work standards ("planning and supervision," "consideration of internal control," "sufficient competent evidential matter") are primarily affected by the use of the statistical sampling in an audit engagement.

Solutions to Multiple Choice Questions

1-12. (b)

1-13. (a)

1-14. (b)

1-15. (c)

1-16. (b)

1-17. (d)

1-18. (d)

1-19. (d)

1-20. (b)

Solution to Case

Procedure	Involves Sampling (Y or N)	Attribute/Variable/NA
A	Y	Attribute
B	N	NA
C	Y	Attribute
D	N	NA
E	N	NA
F	N	NA
G	Y	Attribute
H	Y	Variable
I	N	NA
J	Y	Attribute
K	N	NA
L	N	NA
M	N	NA

Chapter 2: Selecting a Representative Sample

Solutions to Review Questions

2-1. A. True

B. True

C. False

D. False

E. True

F. True

G. True

H. True

I. False

J. True

K. True

2-2. A. Random Number Table Selection

B. Computer Selection

C. Systematic Selection

D. Random Systematic Selection

E. Probability-Proportional-to-Size Selection

F. Stratified Selection

2-3. The term "random sample" is commonly referred to as "probability sampling." "Universe" or "field" are other terms used for population.

2-4. A. The population should be relevant to the audit objective.

B. The population definition should enable anyone to tell whether an item belongs or does not belong to the population.

2-5. The file of prenumbered shipping documents should be the sampling frame. An individual shipping document would be a sample unit.

2-6. Correspondence

Route

Starting Point

Stopping Point

2-7. The route should be precisely defined so that a reviewer could select the same sample items, if necessary.

2-8. The starting point (row, column, and digit starting position) may be determined by the random stab method or by use of a random number to identify the page, row, column, and digit starting position.

2-9. A. Use a 4-digit table look-up scheme. Discards range from 0001 to 0099 and 4893 to 9999. For discards 5000 and over, subtract 5000 from number and remainder becomes a usable number.

B. Subtract 4000 from 4562 and 13482 and use a 4-digit look-up scheme. Usable numbers range from 0562 to 9482. Discards range from 0001 to 0561 and 9483 to 9999. Add 4000 to each usable number to obtain sample item.

C. Use a 4-digit table look-up scheme. The first two digits represent page selection and the last two digits represent line number. Discards range from 53 to 99 for the first two digits and 49 to 99 for the last two digits. Any number discarded by the first two or the last two digits should be completely discarded and another random number selected.

2-10. 646

679

213

507

825

647

228

173

303

783

2-11. Computer generation produces a smaller number of discards and lessens human error.

2-12. The sampling interval is fixed when using systematic selection, while it is variable when using random systematic selection.

2-13. Before using systematic sampling, the auditor should:

A. Be satisfied that the population is in random order.

B. Use more than one random start.

C. Continue sample selection until the population is exhausted.

D. Not substitute one sample item for another population item even if the item selected is not available or hard to find.

E. Use computer generation if practical instead of systematic sampling.

2-14. One start = 20 sampling interval

Two starts = 40 sampling intervals

Six starts = 120 sampling intervals

2-15. 26

66

106

146

2-16. A. $\frac{15000}{100}$ = 150 sampling interval.

B. 150 x 5 = 750 adjusted sampling interval.

C. Five numbers need to be selected from a random number table, ranging from 1 to 750.

D.	1st five samples	15	120	323	444	700
	Sampling interval	+750	+750	+750	+750	+750
	6-10 samples	765	870	1073	1194	1450
	Sampling interval	+750	+750	+750	+750	+750
	11-15 samples	1515	1620	1823	1944	2200

2-17. Ten random numbers are needed from a random number table. Random numbers selected should range from 1 to 20.

2-18. Yes, since a sampling or skip interval is used an item cannot be included in the sample twice.

2-19. Before applying sampling-proportional-to-size, the recorded amount (e.g., book value of credit sales) should exclude any negative amounts (i.e., sales returns). Then, the auditors should:

A. Calculate the sampling interval: Sample Interval = $\frac{\text{Book Value}}{\text{Sample Size}}$

B. Select a random starting from one dollar to the amount of the sampling interval.

C. Starting with the first unit in the population, determine the cumulative dollar amount by summing the items one by one to the end of the population.

D. The unit that the random starting dollar falls within is the first item selected. The next sampling unit is the one that contains the cumulative dollar that is equal to the sum of the random starting point and the sampling interval, and so forth, until the end of the population is reached.

2-20. No. The probability-proportional-to-size selection method automatically stratifies the population.

2-21. "Stratified selection" divides the population into groups (strata), permitting certain groups to be sampled more extensively, whereas "unrestricted random sampling" gives each and every item in the population an equal chance of selection. Unrestricted random sampling is rarely used in audit practice. Discussion questions on the CPA examination are, however, often based on unrestricted random sampling.

2-22. Each student has a different solution to this problem.

Solutions to Multiple-Choice Questions

2-23. (d)

2-24. (c)

2-25. (c)

2-26. (c)

2-27. (a)

2-28. (c)

2-29. (a)

2-30. (d)

2-31. (b)

2-32. (a)

Solution to Cases

C2-1. A. 23258, 23288, 23318

B. 23252, 23289, 23315

C. 23295, 23273, 23303

C2-2 A. A-20, A-19, A-34

B. A-04, A-16, A-28

C. A-02, A-06, A-10

Chapter 3: Attribute Sampling

Solutions to Review Questions

3-1. A. True

B. True

C. False

D. True

E. False

F. True

G. True

H. False

I. True

J. False

K. True

3-2. Discovery

3-3. Attribute

3-4. Fixed sample-size attribute

3-5. Voided checks should be excluded from the population definition. However, the check corresponding to a voided number should be examined to determine if it was properly voided and affixed to the related check stub.

3-6. Areas of audit judgment inherent in attribute sampling are:

A. Define the objective(s) of the test.

B. Define the relevant population.

C. Define the attributes to be tested (and deviation conditions).

D. Determine the risk of assessing control risk too low, the tolerable deviation rate, and the expected deviation rate.

E. Quantitatively evaluate the evidence from the sample.

F. Qualitatively evaluate the sample results.

G. Combine the evidence with evidence from other tests of controls.

3-7. Risk of assessing control risk too low is the risk associated with sampling error in an attribute sampling application. It is the probability associated with assessing control risk lower than is justified by the actual operating effectiveness of the controls. The risk of assessing control risk too low is controlled by varying reliability (one minus the risk of assessing control risk too low).

3-8. Actions that could be considered when tolerable rate (acceptable UPL) is less than achieved UPL are:

A. Increase the assessed level of control risk based on qualitative analysis of deviations.

B. Review the definition of a deviation.

C. Review each identified deviation to be certain it is in fact a deviation from a ***pertinent*** control.

D. Apply alternative audit procedures to determine operational effectiveness.

E. Perform expanded substantive tests.

F. Increase the sample size until achieved UPL is less than or equal to the tolerable rate (achieved UPL).

3-9. According to Table 3.1, the minimum sample size is 45.

3-10. The minimum sample size is ***30*** according to Table 3.5.

Step	Cumulative sample size to use	Stop if cumulative deviations are equal to	Sample more if deviations are	Go to step 5 if deviations are at least
1	30	0	1-3	4
2	48	1	2-3	4
3	63	2	3	4
4	78	3		4
5	Consider increasing assessed level of control risk.			

3-11. The minimum sample size is ***74*** according to Table 3.5.

Step	Cumulative sample size to use	Stop if cumulative deviations are equal to	Sample more if deviations are	Go to step 6 if deviations are at least
1	74	0	1-4	5
2	112	1	2-4	5
3	146	2	3-4	5
4	176	3	4	5
5	206	4		5
6	Consider increasing assessed level of control risk.			

3-12. 90% = 7.27% UPL

95% = 8.28% UPL

97.5% = 9.14% UPL

Table 3.6 is especially useful in practice, since any sample size (e.g., 53, 49, 86) can be evaluated. The practicing auditor's planned sample size is sometimes reduced because of discards or voids.

3-13. 10% = 16% UPL

5% = 20% UPL

2.5% = 24.7% UPL

A sample size of 10 is insufficient because it is too small to produce a tolerable rate of 15% or less. Many practitioners believe tolerable rates above 15% do not support adequate operating effectiveness.

3-14. The estimated population deviation rate is the number of deviations divided by the sample size. Thus, for 2 deviations and a sample size of 80, the estimated population deviation rate is 2.5%.

3-15. The tolerable rate is the maximum deviation rate established such that the possibility of deviations in excess of that rate would cause the auditor to increase the assessed level of control risk. In setting the tolerable rate, the auditor considers the planned assessed level of control risk for the assertion being tested, and the extent of assurance desired by the evidential matter in the sample.

3-16. A pilot sample of 25 is often suggested.

3-17. **Sample Size**

A. 32 (Table 3.1)

B. 93 (Table 3.2)

C. 38 (Table 3.1)

D. 25 (Table 3.1)

3-18. **UPL**

A. 12.4% (Table 3.3)

B. 5.2% (Table 3.4)

C. 6.4% (Table 3.3)

D. 19.9% (Table 3.3)

3-19. A. The auditor expects the occurrence rate to be zero or near zero.

B. The attribute being evaluated is a critical internal control feature (exception: for special studies, discovery sampling may be used to search for fraudulent items).

3-20. **Sample Size**

A. 240 (Table 3.8)

B. 600 (Table 3.8 or Table 3.7)

C. 200 (Table 3.7)

D. 700 (Table 3.9)

3-21. If occurrences are discovered in a discovery sampling application, no statistical conclusion should be expressed. In fact, the auditor should consider drastic revision of the substantive audit program or having a client employee examine the total population searching for additional occurrences.

3-22. Yes, it is feasible to convert an attribute sampling result to a dollar estimate. Three methods of making such an estimate are illustrated at the end of Chapter 3. The difficulty in making the conversion arises from the difficulty of determining the relationship between deviations and monetary misstatement.

If all transactions sampled are processed with the same accounting system and subject to the same controls, the size (dollar amount) of transactions does not influence whether a deviation occurs. In other words, the deviation rate and the size of monetary misstatements are independent.

3-23. A. The auditor should use fixed-size attribute sampling.

B. 77 (Table 3.2)

C. No. Table 3.4 indicates that the achieved UPL is 11.8%.

3-24. No. Only by examining the entire population can the auditor rule out the possibility of any forged checks.

Solutions to Multiple-Choice Questions

3-25. (a)

3-26. (a)

3-27. (a)

3-28. (d)

3-29. (b)

3-30. (b)

3-31. (d)

3-32. (a)

3-33. (b)

3-34. (a)

Solutions to Cases

C3-1. There is no single correct answer. Each student should have a different solution to the case because the case involves a ***subjective*** evaluation of sampling risk. (Point out that the auditor who uses nonstatistical sampling for a test of control must make this subjective type of evaluation. Case 3-2 deals with statistical quantification of the sampling risk.)

C3-2.

Situation	Sample	Achieved UPL
1	A	6.2%
	B	4.6%
2	A	4.7%
	B	6.1%
3	A	4.2%
	B	11.3%
4	A	6.5%
	B	6.0%
5	A	5.9%
	B	8.2%

The student should be instructed to compare the solution in Case 3-1 with Case 3-2. Useful observations in this comparison are:

A. Do not focus on the sample deviation rate and ignore the size of the sample and its effect on inferences about the population.

B. Statistically selected items should not be evaluated without the aid of statistical measurement.

C. Appropriate statistical evaluation of a randomly selected sample may be shown in court to be in conflict with the auditor's judgmental evaluation.

D. Haphazard, block or other judgmental samples should not be evaluated statistically.

This case can also be used to expand the relation between SAS No. 39 and attribute sampling. Ask students: What is the SAS No. 39 term that is equivalent to achieved UPL?

The answer is that there is no precise equivalent. SAS No. 39 calls for calculation of a ***projected deviation rate and consideration of sampling risk.*** Achieved UPL is an objective measurement of the sampling risk. SAS No. 39 does not require quantification of sampling risk because it applies to both statistical and nonstatistical sampling.

C3-3. A.

N	=	2000
Reliability	=	90%
UPL	=	.5%
n	=	460 (Table 3.7)

B. The auditor may conclude that she is 90% confident that payroll padding does not exceed .5% for the 2000 hourly employees.

C. The auditor should stop sampling and consider reviewing all 2000 employees and making other substantial audit program modifications. The most effective audit procedure for detecting fictitious employees is a ***payroll observation.***

D. Attribute tables can be used to evaluate discovery sampling findings. However, since the achieved UPL will also be in excess of acceptable UPL, the benefit produced by such an evaluation is questionable.

C3-4. A. The sample size of 100 should be allocated proportionally as follows:

Denver 50% or 50
Dallas 10% or 10
New York 35% or 35
Midland 5% or 5

B. The sample should not be allocated. A sample should be selected from each branch and conclusions expressed by individual branch.

C. A minimum sample size should be used in both Denver and Dallas. Fixed-sample-size attribute sampling should be used for New York and Midland.

C3-5. Weaknesses noted in purchase transaction test.

1. **Sample Size.** The sample size according to Table 3.2 should be 146, not 100 [using an 8% tolerable rate (UPL)].

2. **Selection.** A test month is not ***representative.***

3. **Stratification.** The population should not be stratified unless two separate control procedures are involved. Consideration should be given to sampling proportional to size if recorded dollars are important.

4. **Evaluation.** The definition and treatment of deviations is not applied correctly. The missing invoice and the two missing approvals are control deviations.

5. **Evaluation.** Attributes should not be lumped together for evaluation. If attributes are defined separately, they should be evaluated separately.

6. **Evaluation.** Qualitative deviation analysis is performed in a superficial fashion. Each deviation should be individually analyzed and its impact on the audit program should be considered.

7. **Professional Standards.** SAS No. 22 (AU 311), "Planning and Supervision" is violated in that the engagement was not properly planned or reviewed. In fact, it appears that the reviewing partner does not have the technical background necessary to review an attribute sampling application.

C3-6. Definition of Attributes

1. **Canceled Check.** Compare canceled check to cash disbursements book noticing date, payee, amount and check number. Canceled checks should also be examined for signature and endorsement. Any check that is not correct in all respects is a deviation and requires explanation.

2. **Account Distribution.** Compare account distribution per paid invoice to client's chart of accounts and trace posting to applicable distribution ledger card. If more than one invoice is being paid with one check, we cannot have more than one deviation; however, if the distribution is wrong on one or more of the invoices, this is a deviation and requires explanation.

3. **Purchase Orders.** Where applicable compare paid invoice to purchase order, noting agreement of quantities, descriptions, prices, and payment terms.

4. **Invoice Canceled.** Review all documents in support of disbursement to determine that they have been canceled. Any exception is a deviation and should be described.

5. **Invoice/Receiving Report Agreement.** Compare quantities per vendor's invoice to quantities actually received per receiving report (filed in receiving department). Any exception is a deviation and should be described.

6. **Clerical Accuracy.** Client checks the clerical accuracy of all invoices; however, notation of such checking is not indicated on the face of each invoice. Recompute the extensions and footing in excess of $100.

C3-7. An attribute should be classified as ***very*** critical if a deviation from prescribed controls has a higher probability of producing a dollar misstatement in the financial statements. A very critical attribute should be evaluated using a low acceptable UPL (7% or less). Although criticalness will vary from client to client, the following represents a reasonable classification.

Payroll	Cash Disbursements
1. Moderately critical	1. Very critical
2. Very critical	2. Moderately critical
3. Moderately critical	3. Least critical
4. Very critical	4. Moderately critical
5. Least critical	5. Moderately critical

C3-8 A. (1) Since the results of tests of controls typically play a significant role in determining the nature, timing, and extent of other audit procedures, the auditor usually specifies a low level of risk of assessing control risk too low. It is usually set at 5 or 10 percent.

(2) In determining the tolerable deviation rate, an auditor should consider the planned assessed level of control risk and the extent of assurance desired from the evidential matter included in the sample.

(3) In determining the expected population deviation rate, an auditor should consider the results of prior years' tests or utilize a pilot sample.

B. (1) There is a decrease in sample size if the acceptable level of the risk of assessing control risk too low is increased.

(2) There is a decrease in sample size if the tolerable deviation rate is increased.

(3) There is an increase in sample size if the expected population deviation rate is increased.

C. Using a judgmental (nonstatistical) sampling approach, the 7% estimated population deviation rate identified in the sample (7 deviations/100 sample items) approaches the tolerable deviation rate of 8%. Therefore, using a judgmental approach, the sample would result also be interpreted as not supporting the planned assessed level of control risk.

D. Statistical sampling allows the auditors to quantify sampling risk. As shown in Table 3.4, statistical sampling may be used to determine that the achieved upper deviation rate is 12.8%.

C3-9

Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Sample Size	35	60	60	65	100	150	125	200
Reliability	90%	90%	90%	95%	95%	95%	95%	95%
Number of Deviations	1	0	2	1	3	2	0	5
Estimated Deviation Rate	2.9%	0.0%	3.3%	1.5%	3.0%	1.3%	0.0%	2.5%
Achieved Upper Precision	10.7%	3.8%	8.7%	7.1%	7.6%	4.2%	2.4%	5.2%