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Auditor's Approach to Statistical Sampling, Volume 2. Sampling Attributes: Estimation and Discovery

American Institute of Certified Public Accountants. Continuing Professional Education Division. Individual Study Program

2

AN AUDITOR'S APPROACH TO STATISTICAL SAMPLING

SAMPLING FOR ATTRIBUTES: ESTIMATION AND DISCOVERY

Individual Study Program
Continuing Professional Education Division
American Institute of Certified Public Accountants

AICPA Continuing Professional Education

NOTICE TO READERS

This programed learning text is a publication of the staff of the American Institute of Certified Public Accountants and is not to be regarded as an official pronouncement of the Institute. It was programed by Teaching Systems, a service of the New York Times. The members of the Committee on Statistical Sampling assisted in an advisory capacity. Dr. Donald M. Roberts acted as statistical consultant in preparing this text for the Committee.

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Volume 2

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PREFACE

In recent years interest in applying statistical techniques to auditing problems has increased. Many CPAs, however, have not had courses in statistics. Others find they have forgotten the concepts already learned.

To help fill the educational void, we have prepared a series of programed instruction texts. This volume is a part of that series. It is designed for auditors who want to use statistics in audit engagements; it is *not* a statistics text.

Sampling for Attributes: Estimation and Discovery is a consolidation of the former Volumes 2 and 4 in this series. It deals with sampling for particular characteristics, such as the frequency of occurrence of a certain event, and is known as "sampling for attributes." This type of sampling is presently widely used on transaction testing, evaluation of a system of internal control, etc., and the statistical techniques outlined in this volume will provide the means for more effective sample selection and evaluation of results.

This book is offered to members as part of the Institute's continuing professional education program.

ROBERT E. SCHLOSSER, PHD., CPA, *Director*
Continuing Professional Education Division

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INTRODUCTION

Sampling For Attributes: Estimation and Discovery is a "programed instruction" text. The essential feature of this method is a step-by-step approach that requires the reader to absorb each point thoroughly before going on to the next. You will note that the pages are divided into three "frames." Within most frames you are required to answer a question or work out a problem as well as read the material. Complete instructions are given below.

Although this method may seem slow at first, it virtually guarantees that the reader who conscientiously works through each frame will, upon completing the book, be able to solve problems, answer questions, and perform tasks that involve all the knowledge required for applying these concepts to actual auditing situations. The reader who has invested the time required in the prescribed manner will be able to work out field problems of this nature without further instruction.

The text has been designed to follow Volume I of this series, *An Introduction to Statistical Concepts and Estimation of Dollar Values*. It is assumed that the reader has an understanding of the concepts taught in that volume. As in Volume I, certain frames have been designated to be skipped by the reader who has evidenced mastery of the topic under discussion. However, except for these clearly specified cases, maximum value will be obtained only by going through each frame according to the sequence "programed" by the authors. If the early chapters seem relatively easy, it is only in order that the reader will be fully prepared for the more difficult later chapters.

INSTRUCTIONS FOR USE

A. Programed Text

Each frame contains either a *blank* to fill in, a *choice* to circle, a *direction* to do an exercise or read an Exhibit in the Supplementary Section, or the phrase "No answer required." In the latter case, simply read the material and go on to the next frame. The "no answer" frames are, however, as important in the teaching sequence as the others, and usually are followed up with a question in a later frame.

If an answer is required, write it directly in the space provided. When a choice is given, it is recommended that you circle the correct one rather than crossing out the wrong one or answering mentally. All questions are designed to be answered easily, based on the material immediately preceding or on your own judgment. The correct answer appears on the following page in the space adjacent to the next frame. If your response is incorrect, you are advised to cross it out and substitute the correct one.

A special format used occasionally in later chapters is the "branching" frame. This consists of a multiple-choice question, together with an instruction to turn to a specified frame depending on the answer you give. Except for these clearly indicated cases, however, all answers appear on the page immediately following the question and should be checked before you proceed to the next frame.

The frames are not to be read *down* the page, but rather go in numerical order *across* the book. Thus, every frame in the top row should be read before going on to the middle row.

B. Supplementary Section

The smaller booklet serves as both a workbook and review book, and is also designed to be a reference manual for on-the-job use. The programed text directs you to the relevant pages in this book at the proper time, and it may also be referred to whenever necessary. The individual summaries should be read immediately before and immediately after each chapter. The recommended procedure is to do one chapter at one uninterrupted sitting.

HOW TO USE THIS MANUAL

This book has been organized according to a method known as "programed instruction." Each page is divided into three paragraphs or "frames." Each one of these frames is numbered. Number 2 is not below Number 1. Instead, it is on the following page. Number 3 is on the page following Number 2, and so on.

Almost every frame contains a question for you to answer. The most common type of question consists of a blank line for you to fill in. Look at Example 1.

EXAMPLE 1. The name of this book is "Sampling for _ _ _ _ _ : Estimation and Discovery."

You have already seen that the name of this book is "Sampling for Attributes: Estimation and Discovery" so naturally you would fill in the word "Attributes" in the blank space.

Sometimes part of the word will already be filled in as an extra clue. Two blanks means that two words are called for.

Another type of question consists of a choice for you to circle. Look at Example 2.

EXAMPLE 2. This book (IS/IS NOT) an ordinary book.

You have already read that this book is not an ordinary book, so you would circle the choice as follows: (IS/(IS NOT))

Of course, most of the questions in this book will not be at this level of simplicity. However, there are always a few hints given. If you read carefully you will get the correct answers in the majority of cases.

After you have read the frame and made your response, *turn the page immediately.* You will find the correct answer on the next page. Then you will simply go on to the next frame. Notice that you do *not* read down the page as you would in an ordinary book. After you have finished the top row of frames in each section, you will be directed to go on to the second row.

If an answer of yours proves to be incorrect, cross it out lightly and substitute the correct answer. Please do not erase any of your wrong answers.

Sometimes there will be no answer required from you. In that case, read the paragraph carefully and then, as always, turn the page and go on to the next.

Now begin with Chapter 1 on the next page.

Chapter 1. DEFINITION OF SAMPLING PROBLEM

1-1. In Volume 1, An Introduction to Statistical Concepts and Estimation of Dollar Values, we discussed estimating the total dollar value of a body of data by examining the individual values of a statistically valid sample. The procedures taught in Volume 1 are referred to as sampling for variables. In this volume, we are concerned with sampling for _____.

WRITE IN YOUR ANSWER AND THEN TURN THE PAGE.

attributes

(The correct answer always appears in this space.)

Now go on to the frame at the right.

1-2. A variable is a characteristic which may be represented numerically and may vary within a range of values. The total dollar value of a firm's accounts payable would be an example of a _____.

WRITE IN YOUR ANSWER AND THEN TURN THE PAGE.

variable

REMINDER

As you go through this book, remember to ignore the material in the rows above and below the one you are reading.

If you make a mistake, go back and cross out your answer and substitute the correct answer.

TURN THE PAGE AND GO ON TO FRAME 1-3.

3-16. From that circle, the arrows now go up the column to the heading Upper Precision Limit. Observe the circle around the value appearing at the top of that column. That value is the upper limit of the population occurrence rate. Enter the value on line 6 of Worksheet 2.

6-11. Once his specified probability of discovery (or the next higher value) has been located, he must identify the line in which it appears. The lines are identified in the left-hand column and correspond to the required sample size. On Table 4-B, a critical occurrence rate of 0.5% and a probability of discovery of 70% would require a sample size of _____items.

	1-3. While variables are defined as <u>quantitative</u> characteristics of a body of data (or population, to employ the more common statistical term), attributes are usually associated with the rate of occurrence of <u>qualitative</u> characteristics of a population. The percentage of vendors' invoices containing errors is an example of a(n) _____. The total dollar value of the invoices is a(n) _____.
6. 2%	3-17. The auditor at the ABC Loan Company can now state that he is 95% confident that not more than 2% of the outstanding loan balances are in error. Does this statement satisfy his sampling objective? (YES/NO)
240	6-12. List the three factors that must be known to determine the proper sample size. 1. _____ 2. _____ 3. _____

attribute variable	1-4. In sampling for variables in Volume 1, we estimated the mean dollar value of the items in a population, from which we estimated the total dollar value by multiplying the mean value by the number of items in the population. In sampling for attributes, we estimate the frequency with which a certain characteristic occurs in a population. Which of the following statements might result from an attribute sampling program? 1. "We estimate, with 90% confidence, that the percentage of accounts receivable with balances more than 90 days overdue is between 8% and 12%." 2. "We estimate, with 90% confidence, that the total value of all accounts more than 90 days overdue is between $73,000 and $79,000.
YES, because the achieved upper precision limit is not larger than the desired upper precision limit.	3-18. On the table for 90% confidence, what would be the achieved upper precision limit if a sample of 160 items revealed 6 occurrences? _____
Population size Critical occurrence rate Specified probability of discovery (ANY ORDER)	6-13. From a population of 12,000 items, an auditor wants a 99% probability of discovering compliance deviations if they occur in the population at the rate of 1% or higher. Determine the appropriate sample size. _____

1. "We estimate, with 90% confidence, that the percentage of accounts receivable with balances more than 90 days overdue is between 8% and 12%."

1-5. An attribute sampling problem requires a precise definition of the characteristic whose frequency of occurrence we are attempting to measure. For every item in the population, we must be able to state unequivocally that the characteristic does exist or does not exist. No other alternatives are possible.

NO ANSWER REQUIRED. TURN THE PAGE.

7%

3-19. For each confidence level, sample size, and number of sample occurrences below, determine, from the tables, the achieved upper precision limit.

	A	B	C
Confidence level	90%	95%	99%
Sample size	80	120	160
Number of sample occurrences	4	8	9
Achieved upper precision limit	___	___	___

460

(If you had this answer correct, go to Frame 6-21. If not, continue with Frame 6-14.)

6-14. To determine the required sample size, the auditor must first locate the table corresponding to the _____ _____.

No answer required	1-6. When examining the items in his sample, the auditor can make only one of two judgments about the item; either the characteristic for which he is looking <u>does</u> exist or it <u>does not</u> exist. Prior to drawing his sample, he must define the characteristic in such a manner that no "gray" areas may arise. (No answer required)
<u>A</u> <u>B</u> <u>C</u> 10% 12% 12%	3-20. As you examined the tables for evaluation of results in Exhibit II, you may have noticed that not every possible number of sample occurrences for a given sample size appears on the table. For example, for a reliability of 99% and a sample size of 160, can you determine directly the achieved upper precision limit corresponding to 10 or 11 sample occurrences? (YES/NO)
population size	6-15. For a population of 12,000 items, the auditor would select Table _____in Exhibit IV.

No answer required	1-7. In attribute sampling, the auditor is concerned with the rate of occurrence of a certain characteristic in a body of data. This rate is usually expressed as a percentage of the total population. If 50 invoices out of a sample of 1000 were found to be in error, the rate of occurrence of errors in the invoices sampled would be expressed as _____.
NO	3-21. Where the exact number of sample occurrences found does not appear, continue along the line until you reach the next larger number. For a reliability of 99%, sample size of 160, and 10 occurrences in the sample, this number would be _____, and the achieved upper precision limit would be _____%.
4-A	6-16. When the correct table has been selected, the auditor must locate the column corresponding to his critical occurrence rate and proceed down that column until he finds his specified _____ or the next higher value.

5%
(50 ÷ 1000 = .05 or 5%)

1-8. The occurrence rate, in percent, could easily be extended to calculate the number of items with the characteristics in a population. If a population of 10,000 inventory records is known to have an error rate of 1%, we could calculate that 100 invoices are in error. However, it is more common to express the rate of occurrence as a _____of the population.

12

14

3-22. In each of the following cases, indicate the achieved upper precision limit.

	A	B	C
Reliability	99%	95%	90%
Sample size	120	120	50
Number of sample occurrences	5	7	6
Achieved upper precision limit	___	___	___

probability of discovery

6-17. The line on which the specified probability (or next higher value) occurs is the required sample size. On Table 4-A (page S-26), for a critical occurrence rate of 1%, a 39% probability of discovery would require a sample size of 50, a 45% probability of discovery would require a sample size of 60, etc. For a probability of discovery of 80%, a sample of _____items would be required, and a probability of discovery of 95% would require a sample size of _____items.

percentage

1-9. Which of the following estimation objectives are examples of sampling for attributes?

___ 1. Estimating the percentage of vendors' invoices received for amounts less than $5.00

___ 2. Estimating the total dollar value of unpaid vendors' invoices at the close of the accounting period

___ 3. Estimating the percentage of vendors' invoices that contain errors

---

A B C

12% 12% 25%

3-23. In evaluating sample results, the relationships between sample size, upper precision limit, reliability, and sample occurrences are identical to those in determining sample size. However, in evaluating results we use the actual _____ of sample occurrences, while in determining sample size, we used the anticipated _____ of sample occurrences.

160

300

6-18. An auditor seeks a 95% probability of discovering at least one occurrence in a population of 15,000 items with a critical occurrence rate of 1%. He selects Table 4-A in Exhibit IV and locates the column corresponding to his critical occurrence rate. Refer to Worksheet 6 (page S-37) in the Supplementary Section. The column corresponding to the critical occurrence rate is the column headed _____%.

X 1. X 3.	1-10. As stated in Frame 1-5, the key to the definition of attribute sampling is the existence of a twofold choice. For each item of the population, either the characteristic does exist or it does not exist. A vendor's invoice may be less than $5.00 or it may not be less than $5.00. Similarly, the vendor's invoice is in error or it is not in error. (No Answer Required)
number Percentage	3-24. Evaluate the following sample results. A B C Reliability 95% 95% 95% Sample size 160 160 160 Number of sample occurrences 2 3 4 Achieved upper precision limit ___ ___ ___
1%	6-19. A circle, marked A, has been drawn on Worksheet 6, Sheet 1, to identify the proper column. The auditor proceeds down that column until he reaches the value of the specified probability of discovery or the next (HIGHER/LOWER) value. Draw a circle around this value and label it B.

No answer required

1-11. An auditor, in reviewing a client's merchandise inventory records, is concerned about the possible existence of a significant percentage of slow-selling items in the inventory activity. The inventory contains a total of 20,000 items. The auditor wishes to estimate the percentage of items where sales in 1974 are less than 50% of the units on hand at December 31, 1974. In this sample, which of the following items exhibits the characteristic the auditor is measuring?

	Item	On Hand (Units)	1974 Sales (Units)
_____1.	AJ05698	375	525
_____2.	KR04398	260	800
_____3.	LM06298	267	63

A	B	C
4%	5%	6%

3-25. As the number of sample occurrences increases while reliability and sample size remain constant, the achieved upper precision limit _____.

HIGHER

Your circle B should appear as on Worksheet 6, Sheet 2 (page S-38).

6-20. The line on which the specified probability occurs determines the required sample size. On Worksheet 6, this would be a sample size of _____.

X 3.

1-12. An auditor examines a random sample drawn from a population of 10,000 records. He determines that the rate of occurrence of errors in his sample is 2%. At this point, he would estimate that the rate of occurrence in the population is also 2%. He would expect this estimate to be:

1. Exactly correct. (If this is your answer, turn to Frame 1-13.)
2. Nearly correct (If this is your answer, turn to Frame 1-14.)
3. Likely to be nearly correct. (If this is your answer, turn to Frame 1-15.)

---

increases

3-26. Evaluate the following sample results.

	A	B	C
Reliability	99%	95%	90%
Sample size	160	160	160
Number of sample occurrences	9	9	9
Achieved upper precision limit	___	___	___

---

300 (See Worksheet 6, Sheet 2, page S-38)

6-21. The steps in determination of the correct sample size in discovery sampling can be summarized as follows:

1. Locate the table for the correct _____.
2. Enter the column for the population occurrence rate that equals the? _____.
3. Proceed down the column until you reach the specified _____ or next higher value.
4. Identify the _____ on the line in which that probability appears.

1-13. YOUR ANSWER: 1. Exactly correct

Statistical sampling techniques are, by definition, methods for estimating population characteristics. The chance that the population would exhibit precisely the same occurrence rate as the sample is too small to warrant consideration.

(Turn back to Frame 1-12 and select another answer.)

A	B	C
12%	10%	9%

3-27. As the reliability decreases, the achieved upper precision limit (INCREASES/DECREASES) when the sample size and the number of sample occurrences remain the same.

population size

critical occurrence rate

probability

sample size

6-22. On Worksheet 5 (page S-36), determine the specified probability and critical occurrence rate for the sampling problem of the Southern Manufacturing Company. Enter your answers on lines 2 and 3 of the Worksheet.

	1-14. YOUR ANSWER: 1. Nearly correct While you may expect an estimate to be close to the population occurrence rate, it is not possible to state with certainty that this is so. We may say, however, that the chances of this being true are measurable. (Turn back to Frame 1-12 and select another answer.)
DECREASES	3-28. In discussing the procedure for determining the required sample size, we mentioned the possibility that an auditor may not be in a position to anticipate a sample occurrence rate and therefore would be unable to use the tables in Exhibit 1. An auditor seeks to determine with 95% reliability whether an inventory, unfamiliar to him, contains not more than 6% of items that have no sales activity in the preceding 12 months. His desired upper precision limit is _____, his specified reliability is _____, and his anticipated sample occurrence rate is _____.
2. 95% 3. 0.5%	6-23. What is the required sample size in the problem of the Southern Manufacturing Company? Enter your answer on Line 4 of Worksheet 5.

	1-15. YOUR ANSWER: 3. Likely to be nearly correct. Best answer. The most appropriate statement of the auditor's findings is that the rate of occurrence of errors in our population is "likely to be contained within some range around 2%." Further, with statistical sampling, we can quantitatively answer the questions, "How likely?", and "Within what range?" (Continue to Frame 1-16)
6% 95% unknown	3-29. Since the auditor must have an estimated occurrence rate to determine the sample size, he could take the following steps: 1. Select a preliminary random sample of 50 records. 2. Count the number of occurrences in that sample. 3. Evaluate the results of that sample. 4. Expand the sample if required. (No answer required)
4. 600	6-24. From examination of the tables, it is apparent that for any given population size and critical occurrence rate, the required sample size (INCREASES/DECREASES) as the specified probability of discovery increases.

	1-16. Application of statistical theory permits us to measure how close the estimated occurrence rate is to the population occurrence rate. This closeness is measured by the precision of the estimate while the precision limits define a range or interval that contains the true population occurrence rate with a specified degree of likelihood. This likelihood is measured by the reliability associated with the precision. (No answer required)
No answer required	3-30. If the auditor's preliminary sample of 50 inventory records indicated no occurrences, he could determine from Exhibit II that the achieved upper precision limit is _____, and his sampling objective (WOULD/ WOULD NOT) be satisfied.
INCREASES	6-25. On Table 4-A of Exhibit IV (page S-26), determine the required sample size for the following conditions: A: Critical occurrence rate 0.2%; Probability of discovery 95%; Sample size 1500 B: Critical occurrence rate 0.3%; Probability of discovery 95%; Sample size _____ C: Critical occurrence rate 0.5%; Probability of discovery 95%; Sample size _____

No answer required	1-17. In sampling for variables, an auditor determines that an estimate of the total value of a certain population is $175,000. He further determines there is a 90% chance that the interval from $165,000 to $185,000 contains the true total value. What is the precision of his estimate? _____ What is the reliability? _____
6% WOULD	3-31. If, however, he found 1 occurrence in the 50 items, the achieved upper precision limit would be 10% and his objective would not be satisfied. However, he could then estimate the occurrence rate to be _____.
B C 1000 600	6-26. In the previous example, note that as the critical occurrence rate increased and the probability of discovery remained constant, the required sample size (INCREASED/DECREASED).

$10,000

90%

1-18. The expression confidence level is synonymous with reliability. Thus, the conclusion, "...a reliability of 90%" could also be stated "... a confidence level of 90%."

(No answer required)

2%
(1 ÷ 50 = .02)

3-32. Using the 2% rate as the anticipated occurrence rate, he can refer to Exhibit 1 and determine, for a specified upper precision limit of 6% and reliability of 95%, that the required sample size is _____.

DECREASED

6-27. Observe the relation between population size and required sample size in the two following cases:

	A	B
Population size	3,000	7,000
Critical occurrence rate	0.5%	0.5%
Probability of discovery	99%	99%
Sample size	800	900

As population size increased from 3,000 to 7,000, the required sample size for a constant critical occurrence rate and probability (INCREASED/DECREASED).

No answer required	1-19. Instead of reporting a precision interval from $165,000 to $185,000, the auditor will often state his result as $175,000 ± $10,000 with a reliability of 90%. These statements are two ways of saying the same thing. (No answer required)
160	3-33. The auditor should then draw an <u>additional</u> sample of 110 items and reevaluate his results. If, in the total sample, he discovers 3 occurrences, (1 in the preliminary sample plus 2 in the additional sample) would his sampling objective be satisfied? (YES/NO)
Increased	6-28. The effect on the required sample size of varying population size is relatively less than the effect of varying the probability of discovery or the critical occurrence rate. However, as the previous example illustrates, increasing population size, while holding other factors constant, will tend to _____the required sample size.

No answer required	1-20. If an auditor reported his results as $300,000 ± $30,000 at 80% reliability, what are the upper and lower precision limits of his estimate? Upper: $_____ Lower: $_____
YES He has 3 occurrences in a sample of 160 and an achieved upper precision limit of 5% at 95% reliability.	3-34. Refer to Worksheet 4, Major Eastern Utility (page S-35). Complete all the lines for which the information is given in the statement of the auditing problem.
increase	6-29. Read the Modern Producers problem on Worksheet 7 (page S-39) in the Supplementary Section. Complete lines 1, 2 and 3 of the Worksheet.

Upper: $330,000
($300,000 + $30,000)

Lower: $270,000
($300,000 - $30,000)

1-21. In estimation sampling for attributes, the auditor's estimate is generally a percentage.

Similarly, the precision limits of his estimate are expressed as percentages. An evaluation of the results of a sample of invoices might indicate an estimated occurrence rate of 3.0% $\pm$ 1.5%.

This means that the interval between _____% and _____% is likely to contain the true population occurrence rate.

1. 2%
2. 5%
3. 90%

3-35. Determine the required sample size and enter your answer on line 4.

1. 2,000
2. 90%
3. 0.5%

6-30. Determine the required sample size for the problem of Modern Producers and enter your answer on line 4 of the Worksheet.

1.5% (3.0% - 1.5%) 4.5% (3.0% + 1.5%)	1-22. From a statistical sample, an auditor determines that the precision interval from 4% to 6% contains the population occurrence rate with reliability of 90%. He is saying, in effect, that were he to choose many samples, about _____% would have the property that the calculated _____interval would contain the true population occurrence rate.
4. 160	3-36. The auditor draws his sample and discovers 3 vouchers that have not been signed by an authorized individual. Complete lines 5 and 6.
4. 460	6-31. In the problem of Modern Producers, the auditor must examine 460 items, or approximately 23% of the population. If his sample were selected from a population several times as large, the required sample size would be about the same, but the <u>percentage</u> of items would _____.

90% precision	1-23. There are many applications of attribute sampling where the auditor is concerned only with the upper precision limit. In many tests of transactions, for example, the auditor seeks a stated degree of assurance that the population occurrence rate does not exceed some tolerable figure. In this case, the (UPPER/LOWER) limit of error rate is more important to the auditor's decision than knowing the precision interval.
5. 3 6. 5%	3-37. Have the criteria of the auditor's sampling plan been satisfied? (YES/NO)
decrease (be less)	6-32. If the auditor at Modern Producers had set his critical occurrence rate at 1% instead of 0.5%, his sample size would have been reduced from 460 to _____items.

UPPER	1-24. In a certain situation the auditor had determined that no serious consequences would result if he could establish that the occurrence rate did not exceed 18%. In a sample of 160 items from a population of 5,000 items he found 16 occurrences. From an evaluation table he finds his upper precision limit is 14% at 90% reliability. Based on the results of his sample, what conclusion can he reach? _____ _____
YES	3-38. As a review, let us go over the several stages of an attribute sampling plan. 1. Definition of sampling plan a. Define the population b. Define the occurrence c. Specify confidence (reliability) level required d. Specify desired upper precision limit Which item is missing from the following sampling plan: An auditor wishes to determine what percentage of the accounts receivable of ABC Corporation are more than 90 days overdue. His desired upper precision limit is a 10% occurrence rate. Missing item:_____
240	6-33. As a review, list the three factors that must be stated to determine the required sample size: 1. _____ 2. _____ 3. _____

Since he is 90% confident that the population occurrence rate is less than or equal to 14%, he can conclude that no serious consequences would result.	1-25. In the previous example, the auditor was faced with a <u>decision</u>: is the population occurrence rate larger than 18%? The conclusion was based on the achieved upper precision limit: if the upper precision limit is no larger than 18%, decide the situation is not serious; otherwise treat it as a serious situation. In that example it is also possible to compute a lower precision limit. Would knowledge of the lower precision limit provide information pertinent to the stated objective? (YES/NO)
confidence level	3-39. The second step is to determine the required sample size. 1. Required information a. Specified upper precision limit b. Anticipated sample occurrence rate c. Required reliability (confidence) level 2. Select sample size from tables for required confidence level. If the specified upper precision limit was 10% and the required confidence level was 90%, what would be the required sample size for a population with an anticipated occurrence rate of 7%?
Population size Critical occurrence rate Probability of discovery (ANY ORDER)	6-34. In determining the required sample size, the population size determines the _____to be used; the critical occurrence rate determines the _____by which the table is entered; the _____on which the specified probability occurs corresponds to the required sample size.

NO	1-26. The objective of many attribute sampling plans in auditing is to decide if a particular accounting control or set of controls is operating satisfactorily. Which of the following statements of results conforms more closely to this objective? 1. I am 95% confident that the deviations from prescribed procedures do not exceed 5%. 2. I am 95% confident that the interval from 1% to 5% contains the true rate of compliance deviations.
240	3-40. The third step is selection of a random sample of the required size from the population. The results are then evaluated. 1. Count occurrences in sample a. Select table for evaluation of results at the required confidence level. b. For sample size used, and number of occurrences found, determine the achieved upper precision limit. If our sample of 240 items revealed 16 occurrences, the achieved upper precision limit for a 90% confidence level would be ____.
table column line	6-35. Indicate with an I the factor(s) below that, when increased, will increase sample size and with a D the factor(s) that will decrease sample size. Assume, in each case, that all other factors remain constant while the factor in consideration is increased. _____ Population size _____ Critical occurrence rate _____ Probability of discovery

1. I am 95% confident that the deviations from prescribed procedures do not exceed 5%.

1-27. As the upper precision limit is increased for a particular sample occurrence rate the degree of confidence with which the auditor can state his findings increases. For example, the auditor finding 16 occurrences in a sample of 160 can be 90% confident that the occurrence rate does not exceed 14%. He can say with (GREATER/LESSER) confidence that it does not exceed 18%.

10%

3-41. Which of the following factors must be known to determine the correct sample size?

_____ 1. Confidence level required

_____ 2. Size of population

_____ 3. Desired upper precision limit

_____ 4. Actual population occurrence rate

_____ 5. Anticipated occurrence rate

__I__ Population size

__D__ Critical occurrence rate

__I__ Probability of discovery

END OF CHAPTER 6

GREATER
(In fact from tables the confidence is 99%)

1-28. An auditor states that 16 occurrences in a sample of 160 establishes a 90% confidence level that the population occurrence rate does not exceed 14%. This statement means that if the population occurrence rate did exceed 14%, 90% of all samples of 160 would contain more than 16 occurrences. If he increases the upper precision limit to 18% at 99% confidence, what is the meaning?

_____

_____

_____

_____

_X_ 1.

_X_ 3.

_X_ 5.

3-42. After the sample has been selected, what three factors must be known to evaluate the sample result from the tables?

1. _____

2. _____

3. _____

Chapter 7. EVALUATION OF DISCOVERY SAMPLES.

7-1. When the sample size has been determined, the auditor must then select those population elements that will be included in the sample.

(No answer required)

If the population occurrence rate exceeds 18%, 99% of all samples of 160 will contain more than 16 occurrences.	1-29. The inference from the statement that if the population occurrence rate exceeds 18%, 99% of all samples of 160 will contain more than 16 occurrences is: if I observe 16 occurrences, then either an event with chances of 1 out of 100 has occurred, or the occurrence rate is smaller than 18%. Choosing the latter explanation, I incur a 1% chance of being incorrect. (No answer required)
(ANY ORDER) Number of sample occurrences Sample size Confidence level	3-43. For 99% confidence that a population with an anticipated error rate of 5% has a true occurrence rate of not more than 10%, a sample of _____items would be required. If the specified confidence level was reduced to 90% the sample size required would be _____items.
No answer required	7-2. When the sample items have been selected, each is examined for the existence of the defined occurrence in the sampling problem. Which of the following occurrences must the auditor consider as errors for the purpose of discovery sampling? 1. Only those errors specifically defined in his problem statement. (If this is your answer, go to Frame 7-3.) 2. Any error in the population regardless of nature or cause. (If this is your answer, go to Frame 7-4.)

No answer required	1-30. For attribute sampling, there are two possible alternatives. From a sample, we may calculate an estimated occurrence rate and determine either a precision interval or just an upper precision limit. Generally, we will do the former when our purpose is to estimate a population occurrence rate, and the latter when we must decide if the population occurrence rate exceeds some desired level. (No answer required)
240 80	3-44. For 95% confidence that the true occurrence rate of a population does not exceed 14% when the anticipated occurrence rate is 5%, a sample of 60 items would be required. If the estimated occurrence rate was increased to 10%, the required sample size would be (INCREASED/DECREASED) to _____items.
	7-3. YOUR ANSWER: 1. Only those errors specifically defined in his problem statement. This is correct. Other errors found in the sample might require a separate sample or other auditing program. However, the auditor has pursued his program with a probability of discovery and critical occurrence rate specified to reflect the relative seriousness of the defined errors. As he uncovers other errors, he might wish to evaluate those errors separately, using the attributes estimation tables corresponding to a reliability consistent with the seriousness of the error. Go to Frame 7-5.

No answer required

1-31. As a review, indicate with a V which of the following sampling objectives are examples of sampling for variables, and indicate with an A which are examples of estimation sampling for attributes.

_____1. Estimating the total dollar amount of inventory

_____2. Estimating the frequency of billing errors

_____3. Estimating the percentage of accounts with balances more than 90 days overdue

---

INCREASED

240

3-45. Indicate which, if any, of the following statements is true. (Assume that all other factors are held equal in each case.)

_____1. As the sample size increases, the difference between the sample occurrence rate and upper precision limit decreases.

_____2. As the specified confidence level increases, required sample size increases.

_____3. As the estimated occurrence rate increases, the required sample size increases.

7-4. YOUR ANSWER: 2. Any error in the population regardless of nature of cause.

This is incorrect. Obviously, an auditor would note any errors found in his sample. However, for evaluating his discovery sample, he would count only those errors defined in the problem statement. Finding other errors, he might well choose to pursue either a separate sampling program with a reliability consistent with the seriousness of the error or some other auditing program.

Go to Frame 7-5.

V 1.

A 2.

A 3.

1-32. In sampling for variables, each element of the population can have any one of a wide range of values, whereas in attribute sampling each element can have one of _____values.

All are true.

3-46. For each of the following examples, assume 95% reliability and a sample occurrence rate of 10%. Enter the number of sample occurrences and upper precision limit for each case.

	A	B	C
Sample size	50	240	1000
Number of sample occurrences	5	___	___
Achieved upper precision limit	___	___	___

7-5. An auditor plans to examine paid checks to discover any errors that could have a monetary effect on the financial statements. Which of the items below constitutes an error for this situation?

1. A spoiled check not properly mutilated. (Go to Frame 7-6.)

2. A payroll check drawn and later approved by a responsible executive, in an amount greater than the authorized limit. (Go to Frame 7-7.)

3. A check for $10.00 where the value has been raised to $10,000.00. (Go to Frame 7-8.)

two

1-33. Which of the following statements describes the result of an attribute sample?

1. I am 90% confident that no more than 2% of the accounts receivable contain balances more than 120 days overdue.

2. I am 90% confident that the total value of accounts receivable with amounts more than 120 days overdue is $180,000 ± $10,000.

3. I am 90% confident that between 4% and 6% of the inventory items are obsolete.

A	B	C
	24	100
20%	14%	12%

3-47. As the sample size <u>increases</u> while the sample occurrence <u>rate</u> and reliability are held constant, the achieved upper precision limit _____.

7-6. YOUR ANSWER: 1. A spoiled check not properly mutilated.

This answer is incorrect. This error probably represents a deviation from internal control procedures. However, it would not ordinarily indicate a discrepancy in the financial statements.

Go back to Frame 7-5 and select another answer.

1. I am 90% confident that no more than 2% of the accounts receivable contain balances more than 120 days overdue.

3. I am 90% confident that between 4% and 6% of the inventory items are obsolete.

END OF CHAPTER 1.

decreases

END OF CHAPTER 3.

7-7. YOUR ANSWER: 2. A payroll check drawn in an amount greater than the authorized limit and later approved by a responsible executive.

This answer is incorrect. The fact that the wrong check was used does not change the company's liability for the expense. Therefore, this would not affect the financial statements.

Go back to Frame 7-5 and select another answer.

Chapter 2. DETERMINATION OF SAMPLE SIZE FOR A DESIRED UPPER PRECISION LIMIT

2-1. If the auditor defines his sampling objective as deciding whether the population occurrence rate is less than or equal to some tolerable proportion, his next step is to determine an appropriate sample size. This is done with the tables in Exhibit I (pages S-13 to S-17). These tables are based on the binomial distribution and are exact when a random sample is drawn with replacement.

(No Answer Required)

Chapter 4. CALCULATION OF PRECISION INTERVALS IN ATTRIBUTE SAMPLING.

4-1. Many audit applications of attribute sampling involve testing compliance with internal control procedures. In those circumstances the auditor is mainly concerned with establishing the upper limit on compliance deviations. The achieved upper precision limit can be evaluated at a specified _____level. There are occasions, however, when a precision interval is useful.

7-8. YOUR ANSWER: 3. A check for $10.00 where the value has been raised to $10,000.00

This answer is correct. An occurrence such as this not only indicates a deviation from internal control procedures and a potential defalcation, but also would affect the financial statements. The problem specifies "errors that could have a monetary effect on the financial statements." From the information given, this is the only error of the three that meets this definition of an error.

No answer required	2-2. In most situations, it is not desirable to select the sample <u>with</u> replacement. When the sample is selected <u>without replacement</u>, the tables provide a good approximation provided the sample size does not exceed 5-10% of the population. In those cases where the sample represents more than 10% of the population, the tables will provide results that are conservative in that the sample sizes will be larger than necessary. Therefore, these tables can be used when sampling with or without replacement. (No answer required)
reliability	4-2. The interpretation of the precision interval in attribute sampling is exactly the same as in dollar value estimation. Namely, the precision interval will contain the population occurrence rate at the specified _____level.
	7-9. In discovery sampling, the auditor determines a sample size sufficient to give him a specified probability that he will uncover at least <u>one</u> occurrence if the population occurrence rate equals or exceeds his specified critical occurrence rate. (No answer required)

No answer required	2-3. Examine Exhibit I, Tables 1-A through 1-E. You will notice that each sheet is headed as follows, and is for a different reliability percentage. Estimation Sampling for Attributes Determination of Sample Size Reliability (Confidence Level): XX% If your sampling plan specified a 95% reliability, to which table would you refer? _____
reliability	4-3. To compute a precision interval we need to determine an upper precision limit and a lower precision limit at a specified reliability. Since we have described how to determine an achieved upper precision limit, the only new tasks are (1) to determine a _____precision limit, and (2) to specify the reliability.
No answer required	7-10. If the auditor finds that the fourth sample item contains the type of occurrence he is looking for, must he continue to examine the remaining items in the sample? _____ Explain why. _____ _____ _____ _____

Table 1-B	2-4. Use of the tables requires a precise definition of the sampling problem. The following three factors must be known. _____1. Anticipated sample occurrence rate _____2. Desired upper precision limit _____3. Required confidence level An auditor seeks to decide with 95% reliability whether a group of vouchers contains fewer than 5% errors. He anticipates from experience, that the occurrence rate is about 2%. Beside 1, 2, and 3 above, enter the corresponding values for this problem.
Lower	4-4. The determination of the lower precision limit is accomplished by using Tables 3-A to 3-C of Exhibit III, pp. S-23 to S-25. These tables are used in the same manner as Tables 2-A to 2-E of Exhibit II are used in determining the achieved upper precision limit. If the desired reliability is 95%, the sample size is 160, and the observed number of occurrences is 20, what is the achieved lower precision limit? _____.
No His objective was discovery of at least one occurrence, not estimation, and he therefore may stop any time his objective is satisfied.	7-11 While finding the defined type of occurrence he is seeking allows the auditor to stop sampling and adjust his audit program, what evaluation of the results can he make if he completes his examination of all the sample items? _____ _____ _____

2% 1.

5% 2.

95% 3.

2-5. There are occasions where an auditor is called upon to examine records with which he has had no previous experience. Therefore, he is in no position to anticipate a sample occurrence rate. Later we will illustrate a procedure to follow in this situation. Generally, however, three quantities must be included in definition of the sampling problem as follows:

1. _____

2. _____

3. _____

8% (from table 3-B)

4-5. The interpretation of the lower precision limit exactly parallels that of the upper precision limit. State in your own words the meaning of the lower precision limit of 8% calculated in Frame 4-4.

_____

_____

_____

He may evaluate the results as an attribute estimation sample.

7-12. For a population of 3000 items, an auditor specified a 99% probability of discovery when the critical occurrence rate of a certain defined error was 1%. His sample of 460 items, selected at random from the population, revealed no errors. Can he establish an upper precision limit at a desired reliability for these results? _____ If "yes," go to Frame 7-14; if "no," go to Frame 7-13.

(ANY ORDER)

ıticipated sample
:currence rate

Desired upper precision limit

Required confidence level

2-6. When these three quantities are known, the auditor can determine the required sample size. The first step is to select the appropriate table in Exhibit I. This selection is determined by:

1. Anticipated occurrence rate
2. Desired upper precision limit
3. Reliability (Confidence level)

The population occurrence rate is not smaller than 8% with reliability equal to 95%.

4-6. For each of the following situations, find the achieved lower precision limits at 95% reliability.

Sample Size	Number of Occurrences	Lower Precision Limit
120	27	_____
90	5	_____

7-13. YOUR ANSWER: No.

This answer is incorrect. While the auditor determined the sample size to satisfy a discovery objective, after he has examined every sample item and found no errors, he has an ordinary attribute estimation sample with zero observed occurrences. Go to Frame 7-15.

3. Reliability (Confidence level)

2-7. Indicate the appropriate table in Exhibit I for each of the following specified confidence levels.

Reliability	Table
99%	_____
90%	_____
95%	_____

16%

2%

4-7. For the same situations, find the achieved upper precision limits at 95% reliability.

Sample Size	Number of Occurrences	Upper Precision Limit
120	27	_____
90	5	_____

7-14. YOUR ANSWER: Yes.

This answer is correct. The auditor may evaluate the sample results on the same basis as any attribute estimation sample with zero observed occurrences.

1-A 1-C 1-B	2-8. Examine Table 1-A (Reliability: 99%) of Exhibit I. This table, like the others, consists of columns headed by the upper precision limit and lines captioned by sample size. Each of the numbers in the table is an anticipated sample occurrence rate and corresponds to a desired upper precision limit and sample size. Of the three quantities, which two are known to the auditor from his sampling plan? 1. _____ 2. _____
30% 12%	4-8. If we combine these results to form a precision interval, we obtain the following: If 27 occurrences are observed in a sample of 120, the precision interval is from 16% to 30%. If 5 occurrences are observed in a sample of 90, the precision interval is from 2% to 12%. In order to make these statements complete it is necessary to know the _____ of the intervals.
	7-15. If the sample of 460 from a population of 3000 items revealed no occurrences, what is the achieved upper precision limit at 99% reliability?

Anticipated sample occurrence .esired upper precision .imit	2-9. To find the required sample size, the auditor first locates the column corresponding to his desired upper precision limit and proceeds down the column until he finds his anticipated sample occurrence rate. He then locates the sample size for the line in which the anticipated sample occurrence rate lies. (No answer required)
reliability	4-9. The reliability associated with the upper and lower precision limits separately is called the <u>one-sided reliability</u>, and the symbol R_1% will henceforth designate this, whereas the symbol R% will designate the reliability for the precision interval. To find the interval reliability, multiply the one-sided reliability by two (2) and subtract one-hundred percent (100%) from the product ($R\% = 2R_1\% - 100\%$). For example, if the one-sided reliability is 90%, the interval reliability R equals 80%. [2(90%)-100%=80%] (No answer required)
1%	7-16. The achieved upper precision limit of 1% at 99% reliability may be read from Table 2-A for estimation sampling. Verify this for yourself. However, it may also be read from Table 4-C for discovery sampling. To do this, we enter the line corresponding to the sample size, read across to the column corresponding to the desired probability, and read that column heading to be the achieved upper precision limit. (No answer required)

No answer required	2-10. The required sample size is determined by: 1. Selecting the table corresponding to the specified _____. 2. Locating the column corresponding to the desired _____ _____. 3. In that column, locating the percentage corresponding to the anticipated _____ _____. 4. The line in which the anticipated occurrence rate occurs is the required _____ _____.
No answer required	4-10. In a previous example (Frames 4-6 and 4-7), the one-sided reliability associated with the achieved upper precision limit of 30% and the achieved lower precision limit of 16% was 95%. What is the reliability of the precision interval ranging from 16% to 30%? _____
No answer required	7-17. This demonstrates that when a discovery sample reveals zero occurrences, the auditor may conclude that the achieved upper precision limit equals the population occurrence rate corresponding to the _____ _____at a reliability level equal to _____.

1. reliability (confidence level) 2. upper precision limit 3. occurrence rate 4. sample size	2-11. An auditor wishes to select a sample from a group of records to determine their accuracy. He anticipates from previous experience that the records contain 5% errors and he wishes to decide with 99% reliability whether the occurrence rate of population errors exceeds 8%. Does he have sufficient information to use the tables in Exhibit I for selection of an appropriate sample size? (YES/NO)
90% [2(95%)-100%]	4-11. If we use Table 2-A to compute the achieved upper precision limit and Table 3-A to compute the achieved lower precision limit, what is the reliability of the resulting precision interval? _____ What if we use Table 2-B and Table 3-B? _____ What if we use Table 2-C and Table 3-C? _____
critical occurrence rate probability of discovery	7-18. Moreover, the discovery sampling tables also provide achieved upper precision limits at other reliability levels. For example, if the auditor wishes to evaluate the sample of 460 from a population of 3000 items at a 95% reliability, what conclusion can he reach, having observed zero occurrences? _____ _____

Yes

2-12. In the previous problem, which of the following three factors determines the table he will use in Exhibit I to determine his required sample size?

1. Upper precision limit
2. Anticipated occurrence rate
3. Reliability (Confidence level)

98%

90%

80%

4-12. For each of the following cases calculate the precision interval at 90% reliability. Remember that the reliability refers to the interval.

Sample Size	Number of Occurrences	Precision Interval
90	9	___ to ___
120	21	___ to ___

The achieved upper precision limit is .6%.

7-19. In using the tables of Exhibit IV for sample evaluation, the following two rules apply.

1. The tables are only applicable if zero sample occurrences are found.
2. The probabilities in the line corresponding to the sample size are valid reliability levels for the occurrence rates shown in the corresponding column headings and read as achieved upper precision limits.

If one or more errors are found, the sample should be evaluated with (ATTRIBUTE ESTIMATION/ DISCOVERY) sampling tables.

3. Reliability (Confidence level)

2-13. For a reliability (confidence level) of 99%, which table in Exhibit I must be used for determining the sample size?

_____

5% to 18%

12% to 25%

(The above were determined from the tables for 95% one-sided reliability in order to obtain 90% interval reliability.)

4-13. For each of the following cases, determine the appropriate one-sided reliability you would use to obtain the indicated interval reliability:

Interval Reliability (R%)	One-sided Reliability (R_1%)
80%	_____
98%	_____

ATTRIBUTE ESTIMATION

7-20. Review Worksheet 5 (Page S-36). In his examination of the vouchers, the auditor finds the following discrepancies. Determine the number of occurrences in the sample and enter your answer on Worksheet 5.

	Amount	Correct Charge	Actual Charge
a.	$ 502.36	General Expense	Administrative Expense
b.	$1,207.42	Advertising Expense	Prepaid Expense

Table 1-A

2-14. Table 1-A has been reproduced as Worksheet 1, Sheet 1. Locate this worksheet (page S-31) so that you may use it in the next few frames. In our problem, the auditor seeks to decide with 99% reliability whether the rate of occurrence of errors in the records exceeds 8%. His first step in selecting the required sample size is to locate the column corresponding to the desired upper precision limit of _____%.

90%

99%

4-14. In Frame 4-12 you calculated the precision interval corresponding to 90% reliability with a sample of 90 items and 9 observed occurrences. In that example, the interval ranged from 5% to 18%. Since the sample occurrence rate is 10% $(\frac{9}{90} \times 100)$, this means that the distance from the estimate to the upper precision limit is 8 percentage points, while the distance from the estimate to the lower precision limit is _____ percentage points.

---

5. 0

(If you had this answer correct, go to Frame 7-22. If you had any other, continue with Frame 7-21.

7-21. Since an incorrect charge to administrative expenses rather than general expenses would have no effect on net income, such an error would not be an occurrence as defined in the problem. The voucher incorrectly charged to Prepaid Expense rather than Advertising Expense is over $1,000 and therefore not a part of the discovery sample in this case. As the problem indicates, all disbursement vouchers greater than $1,000 will be examined individually, not sampled.

(No answer required)

8%	2-15. A circle, marked A, has been drawn on Worksheet 1, Sheet 1, to identify the proper column. The auditor then proceeds down the column until he arrives at the value of his estimated occurrence rate of 5%. Draw a circle around this value and label it B.
5	4-15. In our example, the fact that the distance from the estimate to the upper precision limit (called the upper precision) is (LARGER/SMALLER) than the distance from the estimate to the lower precision limit (called the lower precision) is no accident. This will be the case when the estimated occurrence rate is less than 50%. In such a case, therefore, the upper precision is critical in determining the desired precision.
No answer required	7-22. Since no errors have been found in the sample at Southern Manufacturing, can the auditor make any statement concerning his findings without further analysis? (YES/NO) What statement can the auditor make at 95% reliability? _____ _____ _____

Your circle should appear as on Worksheet 1, Sheet 2.

2-16. The line on which the estimated occurrence rate is found determines the required sample size. On Worksheet 1, Sheet 1, this line corresponds to a sample size of _____.

LARGER

4-16. This means the auditor should use the same tables for determining sample size when he wants a precision interval as when he wants only an upper precision limit. What three quantities were needed to determine the appropriate sample size from the tables in Exhibit I when only the upper precision limit was involved?

1. _____

2. _____

3. _____

YES

At 95% reliability the auditor can state that incorrect charges affecting net income do not occur in over 0.5% of the vouchers under $1,000.

7-23. Can the tables in Exhibit IV be used for further analysis of his sampling findings? (YES/NO) Why?

_____

_____

_____

460

(If you had any other answer, examine Worksheet 1, Sheet 2, and review the last three frames.)

2-17. The steps for selection of the required sample size are summarized as follows:

1. Locate table for specified reliability.
2. On that table, locate column for desired upper precision limit.
3. In that column, locate anticipated occurrence rate.
4. Identify sample size corresponding to the line in which anticipated occurrence rate appears.

(No answer required)

Anticipated sample occurrence rate

Desired upper precision limit

Reliability

4-17. When using those tables to determine the sample size appropriate for a precision interval, the same three quantities should be specified. Since those tables are based on one-sided reliability levels, what conversion is required when the specified reliability refers to a precision interval?

_____

_____

_____

_____

YES

No errors have been found in the sample. Therefore, the tables are applicable.

7-24. What statement can the auditor make with 99% reliability concerning the disbursement vouchers under $1,000 at Southern Manufacturing Company?

_____

No answer required

2-18. From Exhibit I (pages S-13 through S-17), determine the required sample size for each of the following conditions:

	A	B	C
Reliability	99%	90%	95%
Upper precision limit	12%	9%	14%
Aniticpated occurrence rate	5%	5%	10%
Sample size	___	___	___

$R\% = 2R_1\% - 100\%$

or

Interval reliability equals twice the one-sided reliability minus one hundred.

4-18. If the auditor specifies an anticipated occurrence rate of 20%, and a desired upper precision limit of 25%, he is saying that he wants an upper precision of 5 percentage points (.25 - .20 = .05). Consequently, the auditor has his choice of specifying the anticipated occurrence rate and either the desired upper precision limit or the upper _____, from which the upper limit can be computed.

At 99% reliability, he can state that the upper precision limit of incorrect charges equals 0.75%.

7-25. What reliability does the auditor at Southern Manufacturing have that the defined occurrences do not exceed 0.1% of the disbursement vouchers? _____

A	B	C
120	120	240

2-19. In some cases, the anticipated occurrence rate may not appear in the column corresponding to the desired upper precision limit. For a reliability of 90% and a desired upper precision limit of 10%, is there a sample size corresponding to an anticipated occurrence rate of 6%? (YES/NO)

---

precision

4-19. If the auditor specifies an anticipated occurrence rate of 20%, and an upper precision of 5 percentage points, what is the desired upper precision limit? _____

What is the implicit lower precision limit?
_____

46%

7-26. Let's briefly examine the significance of the auditor's statement that at 95% reliability the defined occurrences do not exceed 0.5% of the vouchers. If errors occurred at this rate, there would have been _____such occurrences in the population.

NO	2-20. You may have concluded that there are many reasonable combinations of desired upper precision limits and anticipated occurrence rates where the tables will not work. The numbers displayed on the tables for anticipated occurrence rates such as 2.9%, 3.1%, or 5.9% are not the estimates an auditor would usually make. The anticipated rate would probably be stated in round numbers, i.e., 3,3 and 6. (No answer required)
25% (.20 + .05) 15% (.20 - .05)	4-20. If the observed sample occurrence rate is 20%, we know that the actual lower precision limit will be (LARGER/SMALLER) than the 15% implicit lower limit. State the reason. _____ _____
49 (9800 x .005)	7-27. If each of these 49 occurrences were of the maximum size included in his sampling population, and each overstated income before taxes, the maximum overstatement would be $_____.

No answer required	2-21. Turn again to the sample size determination for a 90% confidence level (Exhibit I, Table 1-C, page S-15). Select a sample size for a 6% upper precision limit and 3% anticipated error rate. As you come down the 6% upper precision limit column you (WILL/WILL NOT) find a 3.0% anticipated error rate. You will notice that the anticipated error rate (INCREASES/DECREASES) as you proceed down the column.
LARGER The distance from the estimate to the upper precision limit is larger than the distance from the estimate to the lower precision limit.	4-21. Suppose the auditor anticipates the occurrence rate to be about 30%, the desired upper precision, 10 percentage points, and the desired interval reliability, 98%. In this case, he should enter Table _____ with an upper precision limit of _____ and an anticipated occurrence rate of _____.
$49,000 (49 x $1,000)	7-28. In specifying the critical occurrence rate for a sampling plan, the auditor should have some estimate of a maximum acceptable overstatement. In the previous example, the auditor is 95% confident that overstatement due to improper posting does not exceed $49,000 assuming all the worst conditions. He must satisfy himself regarding the materiality of such a conclusion. (No answer required)

WILL NOT INCREASES	2-22. The anticipated error rate, 3%, falls between 2.5% and 3.1%, which appear on the table. The sample sizes corresponding to those values are _____ and _____, respectively.
1-A (99% one-sided reliability gives 98% interval reliability) 40% 30%	4-22. The resulting sample size of 160 will meet the auditor's specifications provided the observed occurrences do not exceed 49 (30.6% of 160). A larger number of occurrences would result in a larger upper precision, and fewer occurrences would result in a smaller upper precision. Therefore, to be sure of meeting the specifications, the auditor must specify an anticipated occurrence rate at least as large as he will observe. (No answer required)
No answer required	7-29. Review the problem of Worksheet 7, Modern Producers (page S-39). In his examination of the sample, the auditor finds 3 unauthorized employees in the 460 names selected from the payroll journal. Enter the number of occurrences on Line 5 of Worksheet 7.

120 160	2-23. Of the two choices, 120 and 160, which would furnish the more conservative results? _____
No answer required	4-23. To review, the reliability associated with the precision interval will be _____ when both the upper precision limit and lower precision limit are at 99% reliability.
5. 3	7-30. Can the tables in Exhibit IV be used to evaluate the auditor's findings? (YES/NO) Explain your answer. _____ _____

160 (The reason for this will be explored in greater detail later.)	2-24. The procedure for selecting the sample size is as follows: On the table for sample size determination corresponding to the specified confidence level (reliability), locate the column for the desired upper limit and proceed <u>down</u> that column to the anticipated occurrence rate <u>or next higher value.</u> (No answer required)
98% [2(99%)-100%]	4-24. If the occurrence rate is smaller than 50%, the distance from the occurrence rate to the upper precision limit is (LARGER/SMALLER) than the distance from the occurrence rate to the lower precision limit.
NO The tables apply only when the number of occurrences in the sample is zero.	7-31. An auditor selected a sample of 600 items from a population of 8,000 and discovered no errors. He can state with 71% reliability that the population occurrence rate does not exceed _____ and, with _____ reliability that it does not exceed 0.5%.

No answer required

2-25. Select the sample size required for each of the following cases.

	A	B	C
Confidence level	90%	95%	99%
Desired upper precision limit	8%	10%	12%
Anticipated occurrence rate	3%	4%	8%
Sample size	___	___	___

LARGER

4-25. To determine the appropriate sample size, the auditor needs to specify

1. _____
2. _____
3. _____

0.2%

96%

END OF CHAPTER 7.

A	B	C
90	90	460

2-26. In some cases you will note that there is no anticipated error rate corresponding to a specified upper precision limit and sample size. This presents no problem, however, since the tables are used by entering the column for a desired upper precision limit and proceeding down to the anticipated error rate (or next higher value). The blank spaces are simply ignored.

(No answer required)

Anticipated occurrence rate

Desired upper precision limit or desired upper precision

Desired reliability

4-26. If the desired interval reliability is 90%, you should use the table for _____one-sided reliability to determine the appropriate sample size.

Chapter 8. COMBINING ESTIMATION SAMPLING FOR ATTRIBUTES AND DISCOVERY SAMPLING.

8-1. In many applications, auditors are interested in several attributes. When this is so, a single sample may be selected and each sample item examined for each of the attributes. A statistical evaluation may be made for each attribute.

(No answer required)

No answer required	2-27. In summary, three factors affect the sample size, as follows: 1. Reliability 2. Anticipated occurrence rate 3. Desired upper precision limit To examine the effect of each, in the next few frames you will be asked to select sample sizes from Exhibit I, holding two factors constant while varying the third. We would expect an increase in reliability to (INCREASE/DECREASE) sample size.
95% $(R_1\% = \frac{100\% + R\%}{2})$	END OF CHAPTER 4.
No answer required	8-2. It is possible to examine some attributes from a discovery standpoint while at the same time estimating the occurrence rates for other attributes. Frequently if an error is critical, auditors will use (DISCOVERY/ATTRIBUTE ESTIMATION) while if the error is non-critical the objective will be (DISCOVERY/ATTRIBUTE ESTIMATION).

INCREASE

2-28. Determine the required sample size for each of the following three cases:

	A	B	C
Reliability	90%	95%	99%
Anticipated Occurrence Rate	5%	5%	5%
Desired Upper Precision Limit	10%	10%	10%
Required Sample Size	___	___	___

Chapter 5. DEFINITION OF A DISCOVERY SAMPLING PROBLEM

5-1. The basic objective of discovery sampling is to choose a sample size large enough so that there is a specified probability of the sample including at least one occurrence of some designated attribute, if the population occurrence rate equals or exceeds some stipulated level. Since discovery sampling is concerned with the (OCCURRENCE RATE/ DOLLAR VALUE) of a characteristic, it is a type of (ATTRIBUTE/VARIABLE) sampling.

DISCOVERY

ATTRIBUTE ESTIMATION

8-3. In any given situation, the distinction between critical and non-critical errors is a function of the auditor's judgment. Critical errors would be serious deviations from internal controls, evidence of irregularities, etc.

Deliberately suppressing an invoice in a significant amount would be an example of a (CRITICAL/NON-CRITICAL) error.

A	B	C
80	120	240

2-29. As the specified reliability increased in the preceding frame, the required sample size _____.

OCCURRENCE RATE

ATTRIBUTE

5-2. Discovery sampling can be used when the auditor believes that the population occurrence rate is quite small, but nevertheless wants the sample to be large enough so that if the occurrence rate equals or exceeds some critical rate, the sample will include at least one occurrence with some specified probability. If the population occurrence rate is smaller than the rate specified, the chance that at least one occurrence will be included in the sample is (LARGER/SMALLER) than the specified probability.

CRITICAL

8-4. The reason for using the discovery approach with critical errors is that (1) the auditor does not expect to find any occurrences, and (2) if he should see an occurrence, he would alter his audit program to take this fact into account. If no instance of a critical error is found, then what conclusion is possible? _____

_____

_____

increased

2-30. Determine the required sample size for each of the following three cases.

	A	B	C
Reliability	90%	90%	90%
Anticipated Occurrence Rate	6%	6%	6%
Desired Upper Precision Limit	8%	10%	12%
Required Sample Size	___	___	___

SMALLER

5-3. If the population occurrence rate is much larger than the rate considered critical, the chance that the sample will include at least one occurrence is (LARGER/SMALLER) than specified.

In discovery sampling, the auditor is usually concerned with a characteristic that, if discovered, would indicate the need for a more extensive examination, or would otherwise affect the planned audit program.

The achieved upper precision limit equals the critical occurrence rate at a reliability equal to the probability of discovery.

8-5. Generally in combined plans the sample sizes required for the several attributes are not the same. For example, in a population of 4000 items: (1) the auditor specifies a 95% probability of discovery and a critical occurrence rate of 2% with respect to a certain critical attribute; and (2) an anticipated occurrence rate of 5% with a desired upper precision limit of 10% at 95% reliability for a non-critical attribute. What are the respective sample sizes? _____

_____

A B C 460 160 80	2-31. As the desired upper precision limit increases while the remaining two factors are held constant, the required sample size _____.
LARGER	5-4. If a certain error or irregularity occurs only once in a population, no practical sampling program will provide any reasonable assurance of revealing the sole error or irregularity. To have a reasonable chance of discovery then, the occurrence rate must not be negligible. We shall call the specified rate of occurrence the critical occurrence rate. If the population occurrence rate equals or exceeds the _____ _____ _____, we want a reasonable chance of the sample including at least one occurrence.
160 from Table 4-C 120 from Table 1-B	8-6. In this example, we could use the larger sample size for both attributes. This would result in an achieved upper precision limit of 9% at 95% reliability provided _____ _____.

decreases	2-32. Determine the required sample size for each of the following cases: A B C Reliability 90% 90% 90% Anticipated Occurrence Rate 6% 8% 10% Desired Upper Precision Limit 14% 14% 14% Required Sample Size ___ ___ ___
Critical Occurrence Rate	5-5. The statement of a discovery sampling problem should include the following: 1. The characteristic to be considered an occurrence 2. The critical occurrence rate 3. The specified probability of discovery 4. The definition of the population Which of these elements is missing from the following statement? "An auditor wants 95% assurance that payroll checks for hourly employees have not been overstated."
the observed number of occurrences corresponds to the anticipated occurrence rate (.05 x 160 = 8)	8-7. On the other hand, the requirements of the sampling plan can be met with 120 observations of the non-critical attribute. While the 40 additional observations would provide a smaller upper precision limit, it may also involve considerable costs. It is quite appropriate for the auditor to limit his examination to 120 items with respect to the non-critical error, and to examine 160 items for the critical error. (No answer required)

A B C 50 120 160	2-33. As the anticipated occurrence rate increases while the desired upper precision limit and reliability are held constant, the required sample size _____.
The critical occurrence rate	5-6. Read Worksheet 5 (page S-36) in the Supplementary Section. The population for the discovery sampling problem of Southern Manufacturing Company is which of the following? 1. All disbursement vouchers 2. All disbursement vouchers over $1,000 3. All disbursement vouchers below $1,000
No answer required	8-8. Under what circumstances would he be forced to examine 160 items for the occurrence of the critical error? _____ _____

increases

2-34. In each of the following cases, assume the stated factor is <u>increased</u> while the remaining factors are held constant. Indicate with an <u>I</u> those factors that, when increased, will increase the required sample size and, with a <u>D</u>, those factors that will decrease the required sample size.

_____1. Desired upper precision limit

_____2. Anticipated occurrence rate

_____3. Reliability

3. All disbursement vouchers below $1,000

5-7. Similarly, the characteristic considered to be an occurrence must be precisely defined. An error in a disbursement voucher can occur in any of several ways. In the problem of Worksheet 5, assume that a $500 disbursement paid to a painting contractor was charged to the wrong maintenance account. Would this be an incorrect charge according to the statement of the problem?

1. Yes (If this is your answer, go to Frame 5-8.)

2. No (If this is your answer, go to Frame 5-9.)

If no occurrences were observed in the entire sample.

8-9. If the auditor elects to limit his examination of the non-critical attribute to 120 items, can he use the first 120 items of the 160 that were selected by using a random number table?_____

D 1.

I 2.

I 3.

2-35. Turn to Worksheet 2, ABC Loan Company (page S-33). For the problem specified, enter the appropriate values in lines 1, 2, and 3 in the case study.

5-8. YOUR ANSWER: 1. Yes

This answer is incorrect. Charging the wrong maintenance account would not affect net income. Therefore, it does not meet the auditor's definition of an error.

Review Frame 5-7 and select another answer.

Yes - provided random order is preserved.

8-10. The answer is "YES," if they are examined in the random order in which they were selected. Otherwise, the auditor would have to insure that each of the 160 items had an equal chance of being chosen. How could this be done if the original order of selection could not be used? _____

_____

1. 1%

2. 3%

3. 95%

2-36. Using the tables in Exhibit I, determine the required sample size for the problem of the ABC Loan Company. Enter your answer on Line 4 of Worksheet 2.

5-9. YOUR ANSWER: 2. No

This answer is correct. Charging the wrong maintenance account will not affect net income. Therefore, it does not meet the auditor's definition of an error.

He could establish correspondence and use the random number table to select the items to be examined.

8-11. Read the problem on Worksheet 8, (page S-40), Suburban Supply, and complete lines 1, 2, 3.

4. 340	2-37. If the auditor of the ABC Loan Company required a higher reliability, would his sample size increase or decrease? _____
	5-10. According to the problem in Worksheet 5, would an error exist if a disbursement was charged to property, plant, and equipment when it should have been charged to maintenance? (YES/NO) Please explain your answer. _____ _____
1. 5% 2. 3% 3. 95%	8-12. To determine the required sample size for the non-critical errors you can look at the appropriate table in Exhibit I. The sample size required for the non-critical errors is _____. What sample size would be required to satisfy the auditor's objective with respect to critical errors? _____ Enter this number on line 4 of Worksheet 8.

Increase

2-38. What three quantities must be defined in an attribute-estimation problem to determine the required sample size?

1. _____

2. _____

3. _____

YES

Net income would be overstated by the amount of the incorrectly charged disbursement.

5-11. Identify which of the incorrect charges listed below would be considered errors in the problem of Worksheet 5.

1. A large capital addition incorrectly charged to repairs.

2. A disbursement for advertising expense erroneously charged to sales promotion expense.

300 (from Table 4-A)

4. 460

8-13. By examining the 460 items in the sample for the critical error, what chance does the auditor have of discovering an example if the population occurrence rate is 1%? _____

(ANY ORDER) Anticipated occurrence rate Desired upper precision limit Reliability (Confidence level)	2-39. Must the size of the population be known to determine the required sample size using the tables in this book? (YES/NO)
1. A large capital addition incorrectly charged to repairs.	5-12. In evaluating the results of a discovery sample, the auditor may treat the sample occurrences as he would any attribute sample provided he examines all the sample items. This means that he can use the tables to calculate the achieved _____ _____ _____ at a specified _____ .
99%	8-14. In evaluating his sample of 460 items, the auditor finds the following errors: 5 receipts posted to the wrong account 12 billings posted to the wrong account 1 receipt posted in the wrong amount All of these errors were determined by the auditor to be non-critical errors. Complete lines 5 and 6 of Worksheet 8.

NO	END OF CHAPTER 2.
upper precision limit reliability (confidence)	5-13. It is unlikely that the auditor will evaluate the results in this manner. Since his stated objective is to discover at least one occurrence if any exist at a certain critical rate, he has satisfied his objective when he has found one occurrence. He then has enough evidence to require revision of the audit program. (No answer required)
5. 18 6. 0	8-15. The auditor has found no critical errors in his sample. Therefore, he (CAN/CANNOT) use the discovery sampling tables in Exhibit IV for evaluation of critical errors.

	Chapter 3. EVALUATION OF SAMPLE RESULTS: ONE-SIDED 3-1. After the auditor has determined his required sample size, he must select the sample, perform the audit procedures and evaluate the results. The tables in this volume are exact when sampling with replacement, and provide good approximations when sampling without replacement if the sample size is no more than 5% to 10% of the population size. (No answer required)
No answer required	5-14. On the other hand, if the sample reveals zero instances of the characteristic, the auditor is interested in knowing what the statistical evidence demonstrates. To evaluate the sample results in this circumstance, he should look at the appropriate attribute table (Tables 2-A to 2-E) and find the achieved upper precision limit corresponding to the sample size, specified reliability and number of sample occurrences. In this circumstance, the number of sample occurrences is _____.
CAN	8-16. Refer to the tables for evaluation of results in Exhibit II (pages S-18 through S-22). Has the auditor achieved his desired upper precision limit at 95% reliability for the non-critical errors? (YES/NO)

No answer required	3-2. In selecting his sample and evaluating the results thereof, the auditor must use a random selection method such as the procedure shown in Volume I, An Introduction to Statistical Concepts and Estimation of Dollar Values. Chapter 2 of that volume provides a thorough description of the use of random number tables in sample selection. (No answer required)
zero	5-15. If the auditor specifies the reliability to be the same as the desired probability of discovery he used in determining the discovery sample size, the achieved upper precision limit will be the same as the critical occurrence rate specified for the discovery sample. Thus in practice, he will not require the attribute estimation tables to evaluate the sample when he finds zero occurrences. (No answer required)
NO	8-17. From the tables in Exhibit II, determine the achieved upper precision limit for a 95% reliability and the number of non-critical errors found in the sample. Enter your answer on line 7 of Worksheet 8.

No answer required	3-3. In sampling for attributes, we must examine each element of our sample to determine only if the characteristic under investigation occurs or does not occur. In determining the accuracy of invoices, an auditor discovers that an extension of $109.88 is shown as $190.88. For the purpose of attribute sampling, he would note that: 1. The invoice is in error 2. The invoice is in error by $81.00
No answer required	5-16. For example, suppose the auditor specified a critical occurrence rate of 1% with a specified probability of discovery of 95%, and observes no occurrences in the resulting sample. This means that if the population occurrence rate is as large as 1%, he had a 95% probability of the sample's including at least one occurrence. Comparing this to the explanation of the achieved upper precision limit given in Frame 1-28, you can conclude that having zero occurrences leads to an achieved upper precision limit of _____ at _____reliability.
7. 6% (If you had this answer correct, go to Frame 8-22. If you were incorrect, continue with Frame 8-18.)	8-18. To evaluate an attribute estimation sample, select the table in Exhibit II (pages S-18 through S-22) corresponding to the reliability specified in the problem statement. In the case of Suburban Supply, this would be Table 2-B, Reliability: _____%.

1. The invoice is in error	3-4. As part of his sampling plan, the auditor must define carefully the population and the characteristic that constitutes an occurrence in that population. (No answer required)
1% 95%	5-17. We can now see that in determining the discovery sample size, we should be guided by two considerations: 1. How large should the population occurrence rate be before we want a high probability of the sample including at least one occurrence? 2. If the sample includes zero occurrences, what is the desired upper precision limit at a reliability equal to that same high probability? (No answer required)
95%	8-19. When the correct table has been selected, locate the line for the actual sample size in the left-hand column. For the problem of Worksheet 8, this is _____.

No answer required	3-5. An auditor seeks to determine the percentage of vendors' invoices containing errors. In a sample of 100 invoices, he discovers 8 invoices containing 1 error each and 2 invoices with 2 errors each. What is the number of occurrences in his sample? 1. 12 (Turn to Frame 3-6.) 2. 10 (Turn to Frame 3-7.)
No answer required	END OF CHAPTER 5
460	8-20. Proceed along the line for the sample size until the number of errors found in the sample is reached, or the next higher value. On Table 2-B, the first number in the 460 line equal to or greater than 18, the number of errors found in the sample, is _____.

3-6. YOUR ANSWER: 1. 12

Wrong. Since each sampled invoice must be classified as either correct or incorrect, it follows that an occurrence is the existence of an invoice containing an error. Therefore, the correct answer is:

8 invoices (containing 1 error each)

+2 invoices (containing 2 errors each)

10

Go to Frame 3-8.

Chapter 6. DETERMINATION OF SAMPLE SIZE IN DISCOVERY SAMPLING

6-1. When the auditor has stated his sampling objective, his next step is to determine the required sample size. The sample size can be selected from the tables in Exhibit IV (pages S-26 through S-28) of the Supplementary Section. These tables assume that unrestricted random sampling without replacement will be used.

(No answer required)

18

8-21. Identify the column in which this number appears. For the problem of Suburban Supply, the value, 18, in the 460 line appears in the column for an achieved upper precision limit of _____%.

	3-7. YOUR ANSWER: 2. 10 Correct. Since the auditor has defined his population as vendor's invoices and the characteristic he is investigating as the number of invoices containing errors, the correct answer is 10 invoices.
No answer required	6-2. In the tables used for estimation sampling for attributes, you will recall that population size was not essential to determination of sample size. However, you will note in Exhibit IV that each table refers to a different population size. For example, Table 4-A (page S-26) is for populations over 10,000 and Table 4-B is for populations between _____and _____.
6% (Enter the answer on line 7 of Worksheet 8)	8-22. The auditor can also determine the achieved upper precision limit at a specified reliability for the critical error. Since he observed no occurrences, what reliability levels are associated with the upper precision limit of 1% and .5%? Enter your answer in lines 8 and 9 of Worksheet 8.

3-8. Refer to Worksheet 2 (page S-33), the problem of the ABC Loan Company. Upon selecting his sample of 340 loan balances, the auditor determines that 338 are correct. Enter, on line 5 of Worksheet 2, the number of occurrences discovered in the sample.

5,000

10,000

6-3. Each of the tables corresponds to a relatively broad range of population sizes. The auditor can, therefore, select the proper table using a reasonable approximation of the size of the population he is testing. Tables 4-B and 4-C specify upper and lower limits of population size whereas Table 4-A applies to all populations consisting of (MORE/LESS) than _____items.

8. 99%

9. 90%

8-23. What is the appropriate sample size in the following combined problem for a population of 12,000 items? _____

	Critical Errors	Non-Critical Errors
Reliability	95%	90%
Desired Upper Precision Limit	--	6%
Critical Occurrence Rate	1%	--
Anticipated Error Rate	--	2%

2	3-9. The auditor must now decide if he can state, with 95% confidence (reliability), that the population does not have more than a 3% error rate. To do this, he uses the tables in Exhibit II (page S-18 through page S-22) for evaluation of results. Like the tables for determination of sample size, Exhibit II consists of several individual tables, each of which corresponds to a different _____ _____.
More 10,000	6-4. You will note that the columns in Exhibit IV are headed as follows: "If the Population Occurrence Rate is: X% The Probability of Discovering at Least One Occurrence in the Sample is: a% b% etc." The expression "Population Occurrence Rate" corresponds to (THE ANTICIPATED RATE OF OCCURRENCE/THE CRITICAL OCCURRENCE RATE).
300 (Requirement for discovery sampling, 300, is greater than 90 required for attribute estimation sampling. See Exhibit I, Table 1-C, and Exhibit IV, Table 4-A.	8-24. In cases where the auditor discovers errors in a discovery sampling problem, he (CAN/CANNOT) use discovery sampling tables for evaluation.

required reliability (confidence level)	3-10. Since the sampling problem stipulated that the auditor wanted 95% reliability and a desired upper precision limit of 3%, the auditor selects the table for a _____ confidence level.
THE CRITICAL OCCURRENCE RATE	6-5. To enter the tables, the auditor must select the table corresponding to his _____ and locate the column for the population occurrence rate that corresponds to his _____.
CANNOT	8-25. When the auditor is unable to evaluate his sample findings with discovery tables due to the occurrence of errors in his sample, he can determine the achieved upper precision limit at a given reliability with attribute estimation sampling tables. He selects the table corresponding to his specified _____, enters the line for his actual sample size, locates, on that line, the number of sample errors, and identifies the column in which it appears. This column corresponds to his _____.

95%	3-11. For each confidence level, the tables for evaluation of results indicate the achieved upper precision limits corresponding to various sample sizes and number of sample occurrences. To evaluate our result, we proceed in the opposite direction from the one followed in determining the sample size. In that case we began at the top of the column headed by desired _____ _____ _____, proceeded down the column until we reached the anticipated _____ _____, and noted the sample size on the line in which this occurred.
population size critical occurrence rate	6-6. Read Worksheet 5 (page S-36) and enter, on line 1, the correct population size for the discovery sampling problem of Southern Manufacturing Company.
reliability achieved upper precision limit	8-26. Review the problem of Worksheet 7 (page S-39), Modern Producers. From the tables for evaluation of attribute estimating samples, what statement can the auditor make, with his specified 90% reliability, regarding the occurrence rate of unauthorized employees in his population? _____ _____ _____

upper precision limit occurrence rate	3-12. To evaluate our sample results, we begin at the line corresponding to our actual sample size and proceed along the row until we reach the number of occurrences (not the percentage of occurrences) we discovered in our sample. On Exhibit II, Table 2-B (page S-19), we begin at the line for a sample size of _____ and proceed along that row until we reach _____, the actual number of occurrences found in our sample.
1. 9,800 (10,300-500)	6-7. For the population of Worksheet 5, which table must the auditor use to determine the proper sample size? _____
He has 90% reliability that the population occurrence is less than 2%.	8-27. Which of the following factors is not required for determination of sample size in attribute estimation sampling? 1. Population size 2. Anticipated occurrence rate 3. Specified reliability 4. Desired upper precision limit

340 2	3-13. The upper precision limit at the confidence (reliability) level specified is given at the top of the column in which we find our actual number of sample occurrences. For the sample size of 340 and the two occurrences discovered in the sample of Worksheet 2, what is the achieved upper precision limit for our population occurrence rate at 95% reliability? Enter your answer on Line 6 of Worksheet 2.
Table 4-B	6-8. The auditor first selects the table corresponding to the population size. Then he enters the table in the column corresponding to his specified critical occurrence rate. On Table 4-B (page S-27) he would select the first column to the right of the sample size if his critical occurrence rate was 0.1%, or the next column if his critical occurrence rate was _____%.
1. Population size	8-28. Which of the following factors is not required for determination of sample size in discovery sampling? 1. Population size 2. Anticipated occurrence rate 3. Specified probability of discovery 4. Critical occurrence rate

2% (If this is your answer, proceed to Frame 3-17. If not, continue with Frame 3-14.)	3-14. Unlike the tables for determination of sample size, which show anticipated sample occurrence rates (in %) for various sample sizes, and desired upper limits, the tables for evaluation of results show the _____ of sample occurrences for various sample sizes and achieved upper precision limits.
0.2%	6-9. The numbers that appear in each column are the probabilities of discovery. For example, you will note that the first number in the 0.4% column of Table 4-B is 18. This refers to a _____ of 18%.
2. Anticipated occurrence rate	8-29. To use the discovery sampling tables for sample evaluation, the sample must include _____errors.

number	3-15. Turn to Worksheet 3 (page S-34). This is the 95% confidence level table for evaluation of results. Reading down the extreme left column (the column headed Sample Size), you will note a circle drawn around _____, size of the sample used in the ABC Loan Company problem. Follow the arrows along the row and you will see the next circle drawn around 2, the _____ of occurrences found in the sample.
probability of discovery	6-10. The auditor must proceed down the column until his specified probability of discovery or the next higher value appears. On Table 4-B, for a critical occurrence rate of 0.5% and a probability of discovery of 90%, he would go down the .5% column until he reached 91%, the first value to appear which is equal to or greater than 90%. If the specified probability of discovery were 95%, he would continue until he reached _____%.
zero	8-30. If the discovery sample reveals one or more errors, the sample may be evaluated with tables for _____ sampling.

340 number	NOW TURN BACK TO PAGE 3 AND BEGIN THE SECOND ROW.
96%	NOW TURN BACK TO PAGE 3 AND BEGIN THE THIRD ROW.
attribute estimation	THE END