AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

1. SUBJECT CLASSIFICATION

A. PRIMARY
Population — PA00-0000-C000

B. SECONDARY
General--Population

2. TITLE AND SUBTITLE

Mapping for censuses and surveys; workbook

3. AUTHOR(S)

(101) U.S. Bureau of the Census. Int. Statistical Programs Ctr.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1978	111p.	ARC 312.8.C39ba

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Census/ISPC

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

(For Main report, 367p.; PN-AAC-551) (In Statistical training document ISP-TR-3W)

9. ABSTRACT

10. CONTROL NUMBER
PN-AAG-552

11. PRICE OF DOCUMENT

12. DESCRIPTORS

Mapping
Census
Population density
Surveys
Demcgraphic surveys

13. PROJECT NUMBER
932096600

14. CONTRACT NUMBER
RS/COM/BUCEN-04-75

15. TYPE OF DOCUMENT

AID 590-1 (4-74)

BUREAU OF THE CENSUS
Manuel D. Plotkin, Director
Robert L. Hagan, Deputy Director
Daniel B. Levine, Associate Director
for Demographic Fields

INTERNATIONAL STATISTICAL PROGRAMS CENTER
J. Timothy Sprehe, Chief

ACKNOWLEDGMENTS

Statistical Training Document ISP-TR-3W was prepared in the International Statistical Programs Center as a supplement to Statistical Training Document ISP-TR-3, *Mapping for Censuses and Surveys*. This workbook was prepared by Janelle Fowler, Survey Statistician, International Statistical Programs Center, Marvin F. Gordon, Chairman of the Department of Geography and Regional Science of the George Washington University, and Donald J. Volk, Geographic Consultant. Sandra Garner and Joan Godwin prepared the material for printing.

This document was prepared under a Resources Support Services Agreement with the U.S. Agency for International Development.

SUGGESTED CITATION

U.S. Bureau of the Census, Mapping for Censuses and Surveys, Workbook, Statistical Training Document ISP-TR-3W, Washington, D.C.,1978

STATISTICAL TRAINING DOCUMENT
ISP-TR-3W

Workbook

Mapping for Censuses and Surveys

U.S. Department of Commerce
Juanita M. Kreps,
Secretary

BUREAU OF THE CENSUS
Manuel D. Plotkin,
Director

Issued March 1978

Mapping for Censuses and Surveys

The 15 chapters are contained in Statistical Training Document No. 3; study exercises to accompany the 15 chapters are contained in the workbook, Statistical Training Document No. 3W.

CONTENTS

INTRODUCTION

Document ISP-TR-3W is a workbook to be used as a training aid in conjunction with the publication ISP-TR-3, *Mapping for Censuses and Surveys*, which covers all aspects of developing and implementing a mapping program for censuses and surveys. The study materials contained in this workbook complement the text and exhibits in the manual and are intended to clarify the concepts, considerations, and practical applications presented therein. Supplying answers to questions and working the problems in the study assignments reinforce the principles and procedures discussed in the manual. Note that the pages may be removed from the workbook and used as tests.

The study materials in the workbook are arranged by chapters in the same sequence as in the manual. The exercises consist of questions and computations, many of which are an adaptation of the concepts or techniques presented in the manual. For selected computations, a protractor, compass, and ruler are needed. Some questions require a simple YES or NO answer; some require a choice of the answers that are given; and others require that a word, sentence, or short paragraph be written. Examples of the various kinds of questions follow.

1. *Multiple choice: Choose the best answer, unless instructed that there is more than one answer.*

   What color is ordinarily used to depict bodies of water on a map?

   a. ☐ Orange
   b. ☒ Blue
   c. ☐ Green
   d. ☐ Brown

2. *List: Provide a short answer to the question asked.*

   What are the four basic directions of a compass?

   a. North
   b. East
   c. South
   d. West

3. *Choice of one of two words: Circle the correct word or phrase to make the sentence a true statement.*

   The North Pole is located in the (Arctic/Antarctic) Zone.

4. *Ordering: Indicate the correct order of the steps or procedures, using "1" for the first step.*

Drafting is one of the procedures required to prepare maps for censuses and surveys. Indicate the order of the steps listed below.

3 Draft the map

1 Order equipment and materials

4 Review the drafted map

2 Train the draftsmen

5 Correct errors found by the reviewer

5. *Matching: In the space in the left column, enter the letter of the appropriate category from the column on the right. In most cases, there are more categories in the right column than in the left column.*

The left column lists equipment used in map sketching and drafting. The right column lists their uses. Match the two columns.

C Compass	A. Draw lines on a map
D Ruler	B. Reproduce maps
A Pen	C. Measure direction
B Printing press	D. Measure length
F Electric eraser	E. Develop film
	F. Eliminate lines on a map

Some questions refer back to a figure or exhibit in the manual. A figure is identified by the chapter number and a letter suffix. An exhibit is identified by chapter number and sequence number within the chapter. The air photos that are used in the exercises for chapters 3, 4, and 13 are printed in a separate signature and are bound in the middle of the workbook.

Chapter 1. NEED FOR MAPS

Census enumerators have "mental maps" of the areas in which they will be enumerating in the same way that all of us have mental maps of our countries and the world. These mental maps may not be too accurate. Test your mental map of the world by answering questions 1 to 4 without referring to an atlas.

1. At its widest point, which continent covers the greatest distance from west to east?

   a. ☐ Asia
   b. ☐ Africa
   c. ☐ South America
   d. ☐ Europe

2. Which country has the largest area?

   a. ☐ Switzerland
   b. ☐ Thailand
   c. ☐ Nigeria
   d. ☐ Nepal

3. How many countries have a common border with France?

   a. ☐ Two
   b. ☐ Four
   c. ☐ Five
   d. ☐ Seven

4. What direction is Brazil in relation to Mexico? Brazil is--

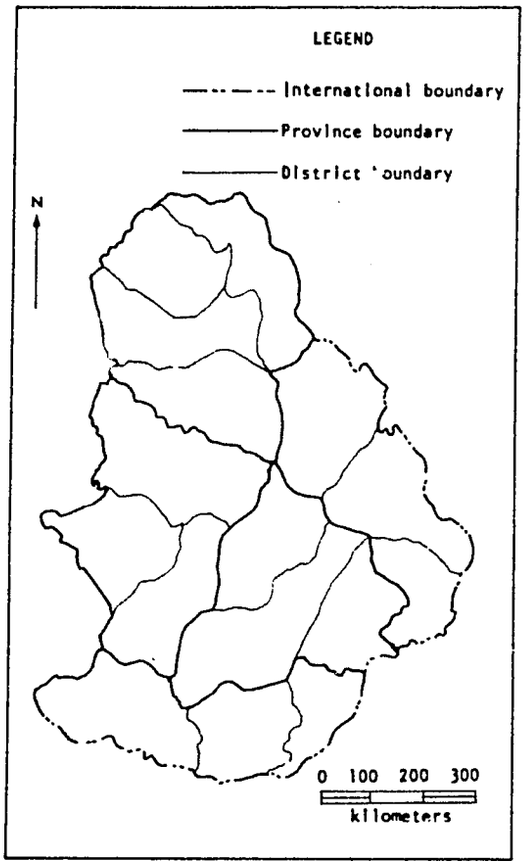
   a. ☐ Southeast of Mexico
   b. ☐ Southwest of Mexico
   c. ☐ East of Mexico
   d. ☐ South of Mexico

5. Maps are needed in several stages of the census. List three stages for which maps are required.

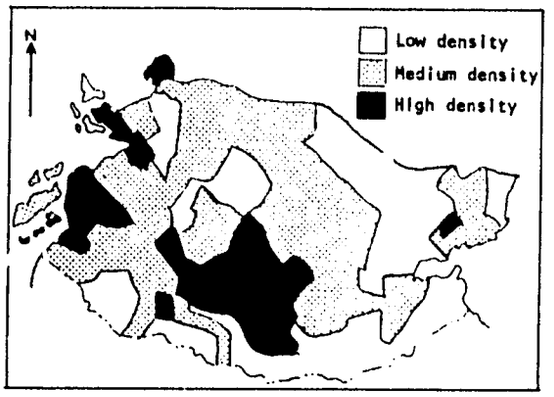
   a. _____
   b. _____
   c. _____

6. An enumeration area (may/must not) cross boundaries of an administrative area or a statistical area.

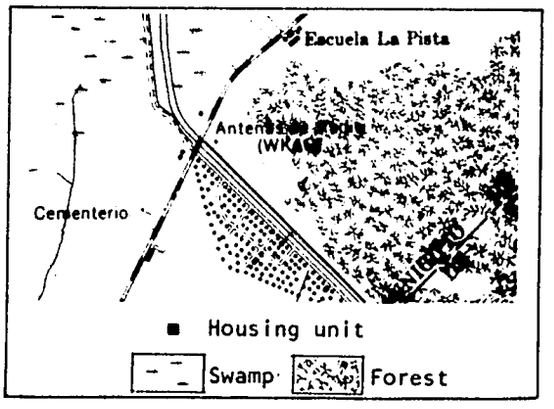
MAP A



MAP B



MAP C



For questions 7-14 refer to the maps above. To the right of each question, circle A, B, or C. Which map--

7. Shows population density..... A B C
8. Shows swamps and forests..... A B C
9. Gives the information for measuring distance.... A B C
10. Shows three kinds of administrative boundaries.. A B C

11. Shows the location of housing units..... A B C
12. Does not show direction..... A B C
13. Shows statistical results..... A B C
14. Shows roads and trails..... A B C

15. The study of mountains, plains, lowlands, rivers, climate, and vegetation is called--

a. ☐ Cartography
b. ☐ Physical geography
c. ☐ Human geography
d. ☐ Geology

16. In figure 1g of the mapping manual, the EA is bounded on the south by--

a. ☐ Cairo Street
b. ☐ Damascas Drive
c. ☐ Dakar Street
d. ☐ Stano District Line

17. In figure 1g of the mapping manual, the EA is bounded on the north by--

a. ☐ Burka District Line
b. ☐ Kabul Street
c. ☐ Simba
d. ☐ Lima Street

18. For a census, maps have many uses. Which use is the most important for a population census? (Assume that enumerators are familiar with their areas.)

a. ☐ Assure complete coverage
b. ☐ Determine best route of travel
c. ☐ Measure distances
d. ☐ Locate a place or person
e. ☐ Serve as a progress report

19. How can a map be used as a progress report form?

_____

_____

20. Maps for the enumerators should be (small-scale/large-scale) maps.

21. Maps are used to present statistical results. List three statistical items that can be shown effectively on a map (for example, population density).

a. _____
b. _____
c. _____

22. List three examples of specialized maps.

a. _____
b. _____
c. _____

QUESTIONS FOR DISCUSSION

23. How can maps help in planning the location of field offices?

24. Why is a geographic coding system important in a census or survey?

25. What types of statistical maps would you recommend for inclusion in the published reports for a census of agriculture?

Chapter 2. ORGANIZING A MAPPING PROGRAM

1. A person who designs and constructs maps is a--

   a. ☐ Cartographer
   b. ☐ Geographer
   c. ☐ Compiler

2. List four basic decisions that must be made before the preparation of census maps begins.

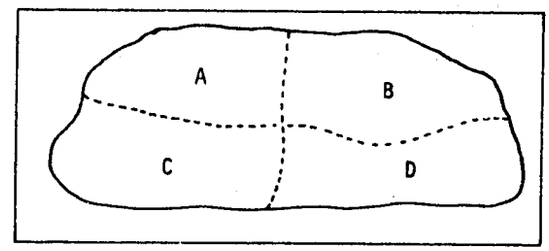
   a. _____
   b. _____
   c. _____
   d. _____

3. List two reasons why the census planners need population estimates for small areas such as EA's.

   a. _____
   b. _____

4. A local official reports that there are 85 housing units in area A, 60 in area B, 30 in area C, and 65 in area D. Assuming an average of 5 persons per housing unit, what is the estimated population of each of the four areas?

   _____ Area A
   _____ Area B
   _____ Area C
   _____ Area D



5. In making up EA's, the NSO planned for a workload of about 600 people per EA. Assuming that areas A, B, C, and D of question 4 are within one administrative area, how would the NSO set up the EA's?

   a. ☐ Combine A and C; combine B and D
   b. ☐ Combine A and B; combine C and D
   c. ☐ Make four separate EA's
   d. ☐ Make one EA consisting of A, B, C, and D

6. Assume that a country has 11 provinces. One province has only 9 districts and the largest province has 116 districts. How many digits would you need for a district code?

   a. ☐ 1
   b. ☐ 2
   c. ☐ 3
   d. ☐ 4

7. Setting up an average enumerator workload is influenced partly by geographical considerations such as the effect of hilly terrain. List two considerations that are not geographical.

   a. _____

   b. _____

8. List four kinds of maps that the NSO needs for the census enumeration and for publication.

   a. _____

   b. _____

   c. _____

   d. _____

9. As a rule which is less costly to do?

   a. ☐ Revise an existing map
   b. ☐ Draft a new map

10. In map acquisition work, a respondent may say, "We have some maps but they do not cover the whole country; besides, they have been made to meet certain specifications and needs of our agency." What is the best response you can give?

    a. ☐ Do you plan to expand your mapping activities soon--so that you may have maps of use in a census?

    b. ☐ May we look at your maps? Often they contain useful information for census purposes.

    c. ☐ We are interested in maps for population and agricultural censuses. Do your maps contain any information on population or agriculture?

    d. ☐ We are interested in maps that show only the natural features of an area, but your maps need not cover the whole country to be useful to us.

11. The following are various steps to be taken in census mapping. Put them in the correct order, using "1" for the first step and "5" for the fifth step.

    _____ Field check of boundaries by mapping staff
    _____ EA delineation
    _____ Map inventory
    _____ Training enumerators in map reading
    _____ Drafting maps for publication

12. According to exhibit 2-3, when would map inventory work be done?

a. ☐ Start at the same time as preparation of field-use maps
b. ☐ Start 2¼ years before census date and continue
c. ☐ Start 2¼ years before census date and complete in 4 months
d. ☐ Continue up to census date

13. Refer to the calendar of mapping activities, exhibit 2-4. How much time is scheduled for the preparation and review of enumeration maps (excluding PES)?

a. ☐ ½ year
b. ☐ 1½ years
c. ☐ 2½ years
d. ☐ 3 years

14. Refer to exhibit 2-4. When should personnel needs be estimated?

a. ☐ When the calendar of activities is completed
b. ☐ Shortly after the budget process begins
c. ☐ After the budget is prepared
d. ☐ When the map inventory is completed

15. Refer to exhibit 2-4. When should the preparation of enumeration maps (excluding PES) be completed?

a. ☐ 5 months before the complete enumeration
b. ☐ 1 month before the enumeration
c. ☐ 1 year before the enumeration
d. ☐ 1½ years before the enumeration

16. Who is responsible for keeping records on the operations of more than one staff?

a. ☐ Planning branch
b. ☐ Central control
c. ☐ Base map compilation section
d. ☐ Administrative staff

17. An operation to limit the amount of error to a pre-determined level is called--

a. ☐ Quality control
b. ☐ Enumerator control
c. ☐ Work-flow control
d. ☐ Administrative control

For questions 18-22, match the two columns. In the space on the left, enter the appropriate letter from the column on the right which identifies the persons who would perform the task.

18.	____	Acquire and evaluate maps and air photos	A. Planning staff
19.	____	Determine enumerator workload	B. EA delineation staff
20.	____	Make copies	C. Reproduction staff
21.	____	Divide administrative divisions into EA's	D. Compilation staff
22.	____	Prepare instructions on use of mapping materials for drafting	

23. List two purposes of an EA listing.

a. _____

b. _____

24. Progress reports and calendars are examples of--

a. ☐ Quality control
b. ☐ Enumerator control
c. ☐ Statistical control
d. ☐ Administrative control

QUESTIONS FOR DISCUSSION

25. In a geographic coding system, why would you allow some gaps in the code numbers?

26. For a country that has no continuing mapping program, mapping for a census may be a relatively costly and time-consuming job, depending on the availability of source materials. How can a census mapping program benefit other statistical programs?

27. Of what value is a procedural history?

Chapter 3. MAP INTERPRETATION

1. A small-scale map covers-

   a. ☐ A continent
   b. ☐ An area the size of a small city
   c. ☐ An area the size of a city block

2. When a scale is altered from 1:1000 to 1:4000 the map sheet becomes--

   a. ☐ Four times as large
   b. ☐ Four times as small
   c. ☐ 16 times as large
   d. ☐ 16 times as small

3. Changing a scale from $\frac{1}{1000}$ to $\frac{1}{500}$ results in the map sheet being changed to--

   a. ☐ 5 times as large
   b. ☐ Twice as large
   c. ☐ Half as large
   d. ☐ 4 times as large
   e. ☐ None of these

Answer questions 4 and 5 concerning a conversion of map scale. (If appropriate, use the figure of 62,500 to indicate the number of inches in a mile.)

4. Convert 1:25,000 to a graphic scale showing units of one mile. How long, in inches, would a unit (of 1 mile) be?

   a. ☐ 0.4 inch
   b. ☐ 1.56 inches
   c. ☐ 2.5 inches
   d. ☐ 1 inch

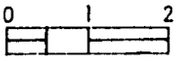
5. Convert "one centimeter represents five kilometers" to a graphic scale showing units of 1 km. How long would one unit (of 1 km) be?

   a. ☐ 1.0 mm
   b. ☐ 0.3 cm
   c. ☐ 2.5 cm
   d. ☐ 2.0 mm

6. A map is 30 cm by 40 cm. Its scale is 1:50,000. How large is the area shown on the map in square kilometers?

   a. ☐ 1,500
   b. ☐ 1,200
   c. ☐ 600
   d. ☐ 300

7. Which scale would be most useful on a map that might have to be reduced?

   a. ☐ One inch represents 1 mile
   b. ☐ 1:25,000
   c. ☐ 

miles
   d. ☐ $\frac{1}{10,000}$

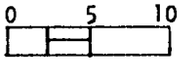
8. Using figure 9c of the mapping manual and the paper strip method, compute the distance in miles and kilometers from Sula (in Lom-Sak Province) to Athena (in Lorraine Province).

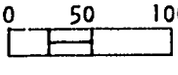
   a. _____ Miles
   b. _____ Kilometers

9. One way to measure areas on a map is by means of--

   a. ☐ Representative fractions
   b. ☐ Parallel lines
   c. ☐ Similar projections
   d. ☐ Hachures

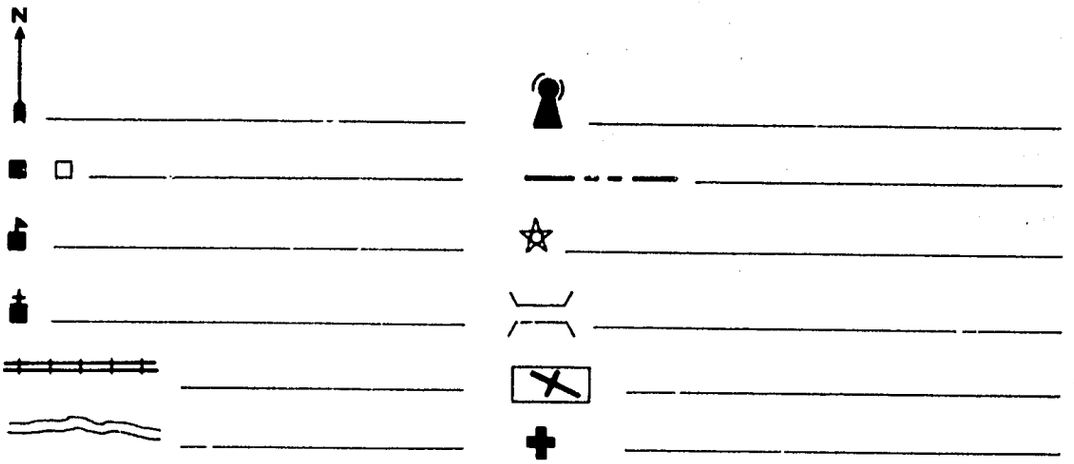
10. Below are several numbers, words, scales, and phrases. They describe scales or features found on maps. On which scale size would each be found--small, medium, or large? To the left of each item enter S for a small-scale map, M for a medium-scale map, or L for a large-scale map.

    a. _____ $\frac{1}{1,500,000}$
    b. _____ Rural EA
    c. _____ One city block
    d. _____ 1:250,000
    e. _____ Outline of a large country
    f. _____ 1:50,000
    g. _____ 1 cm represents 5 meters
    h. _____ 

feet
    i. _____ 

kilometers

11. Identify the following symbols:



12. Using the space below, create a map with the following features:

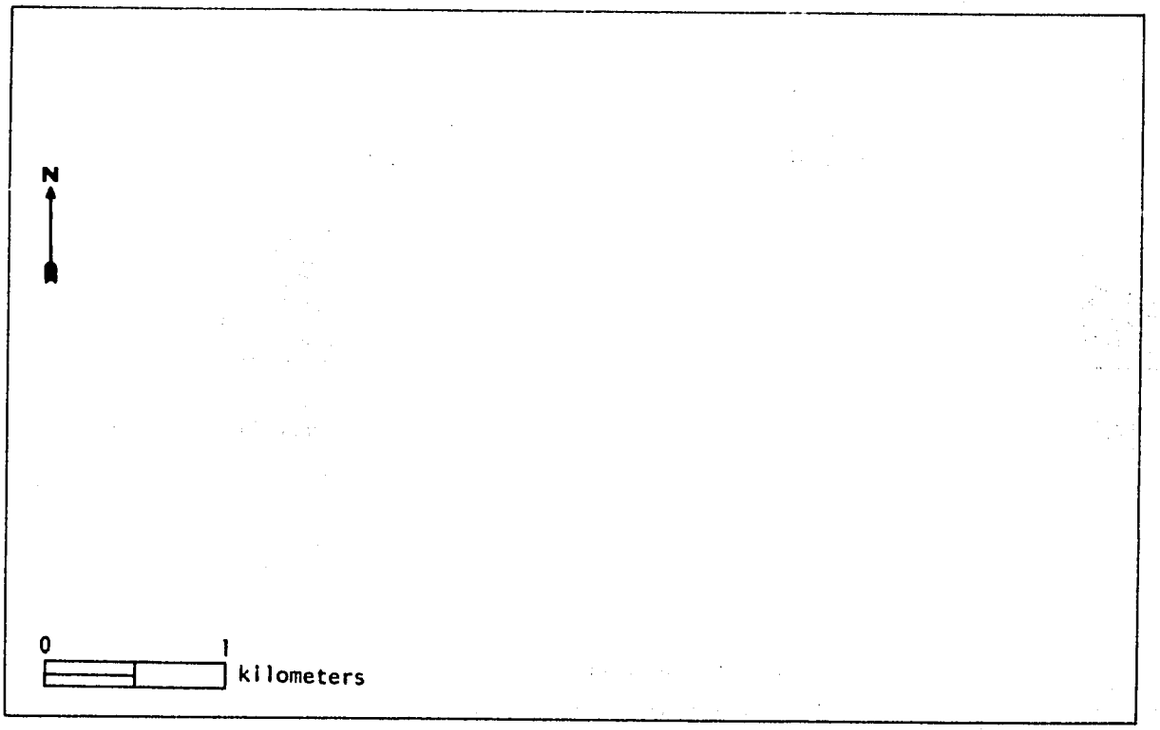
a. A railroad lying east-west near the top of the map.

b. A small river 2.5 km south of the railroad and parallel to the railroad.

c. Two roads perpendicular to the railroad, crossing both the railroad and the river by means of bridges. These roads are 2 km apart. Name them West Highway and Eastern Avenue, respectively.

d. A hospital between the railroad and the river and east of West Highway.

e. A church and a school 0.5 km south of the river, on opposite sides of Eastern Avenue.



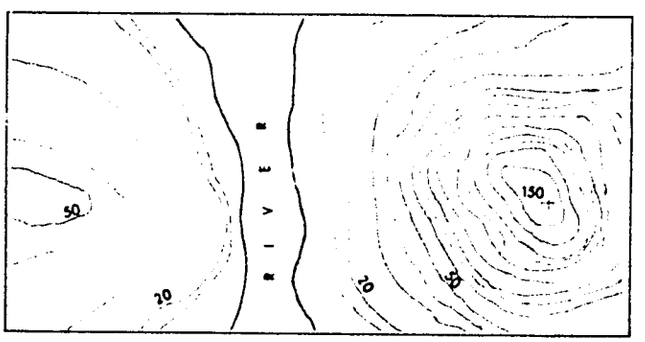
13. Contour lines, layer tinting, hachuring, and shading are methods used to show--

- a. ☐ Vegetation
- b. ☐ Dimension
- c. ☐ Elevation and relief
- d. ☐ Profile

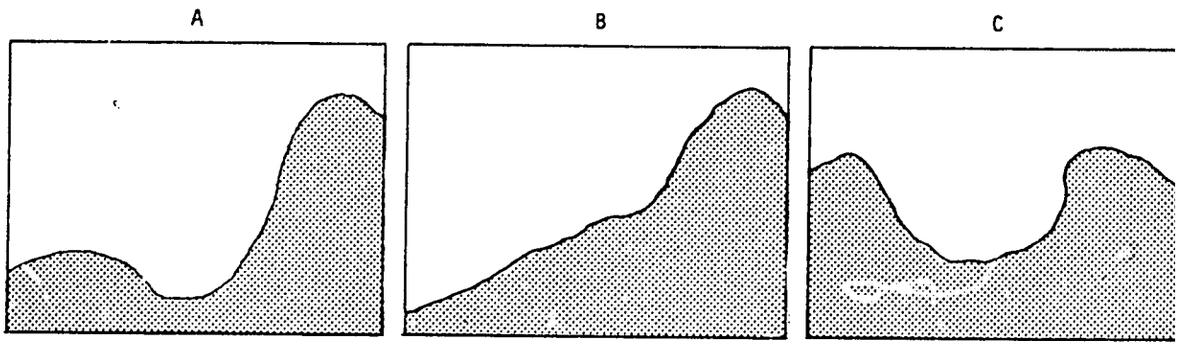
14. One of the characteristics of contour lines is that they--

- a. ☐ Seldom fork or cross each other
- b. ☐ Never fork or cross each other
- c. ☐ Never close
- d. ☐ Always form arrows pointing downstream (when they cross streams)

15. What is the highest elevation indicated on the contour drawing below? ___



16. Which of the three profile views below depicts the contour drawing of question 15? Circle the appropriate letter.



17. Check one or more boxes. A slope that changes 5 meters vertically for every 200 meters horizontally can also be expressed as--

- a. ☐ 5:200
- b. ☐ 5 percent
- c. ☐ 1:100
- d. ☐ 1:40
- e. ☐ 2.5 percent
- f. ☐ Rising 200 meters for every 5 horizontal meters

18. An equivalent projection does which of the following?

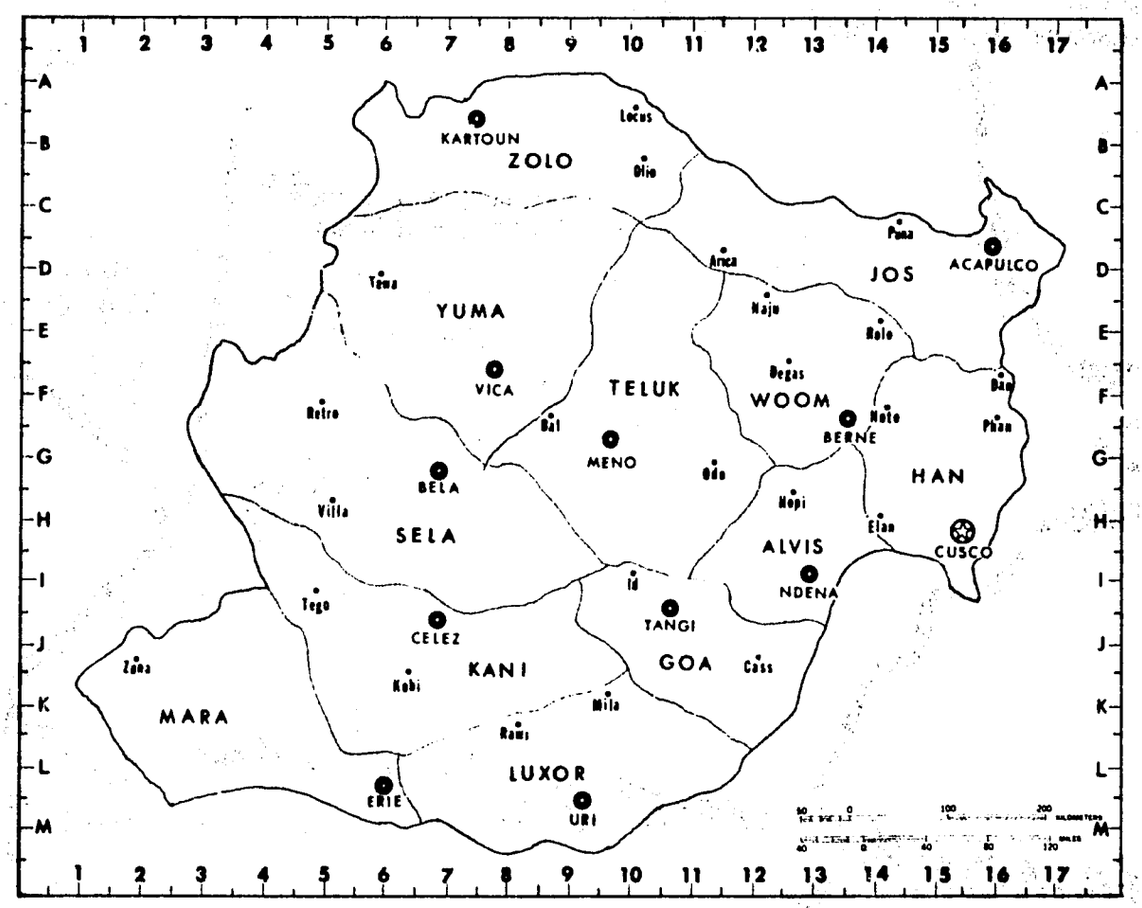
a. ☐ Shows layer tinting accurately

b. ☐ Shows the relative size of areas correctly

c. ☐ Is the only type of map which shows all features of the globe accurately and without distortion

d. ☐ Is not useful for census work

For questions 19 and 20, use the grid coordinate system in the map below.



19. Plot the following points on the map and label them with letters A through G, respectively.

a. A7

b. B4

c. E15

d. J2

e. F9

f. K10

g. H4

20. What are the approximate coordinates for the following?

a. _____ Tangi

b. _____ Kartoun

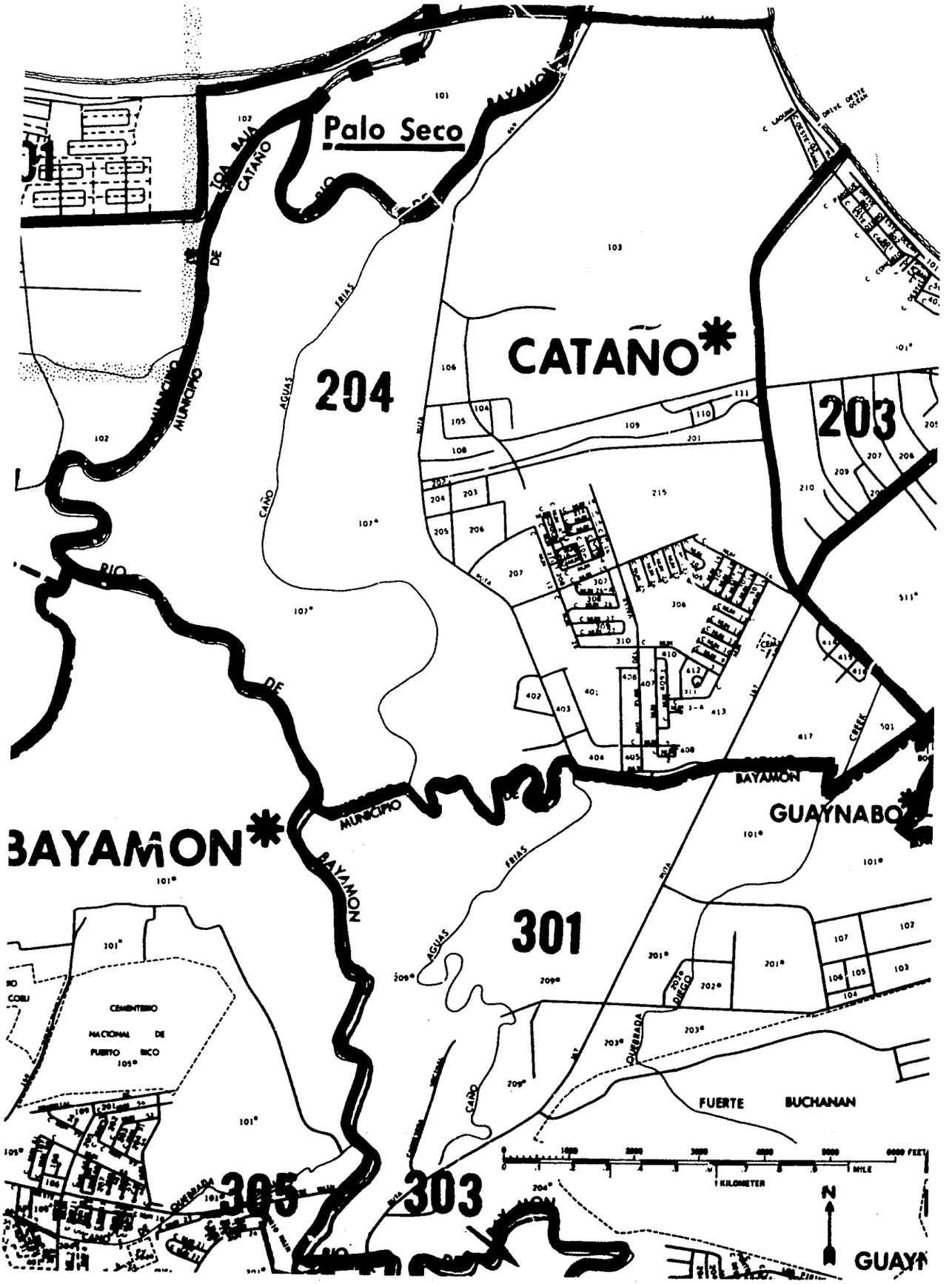
c. _____ Acapulco

d. _____ Celez

e. _____ Cusco

f. _____ Erie

For questions 21-26, refer to the map below.



21. What is the approximate area of tract 204?

a. ☐ 1 km^2
b. ☐ 5 km^2
c. ☐ 10 km^2
d. ☐ 50 km^2

22. Which boundary of tract 204 is formed by a river (río)?

a. ☐ West
b. ☐ South
c. ☐ East
d. ☐ North

23. Which part of tract 204 appears to be most densely populated?

a. ☐ Northeast
b. ☐ Southeast
c. ☐ Northwest
d. ☐ Southwest

24. What is the approximate scale of the map?

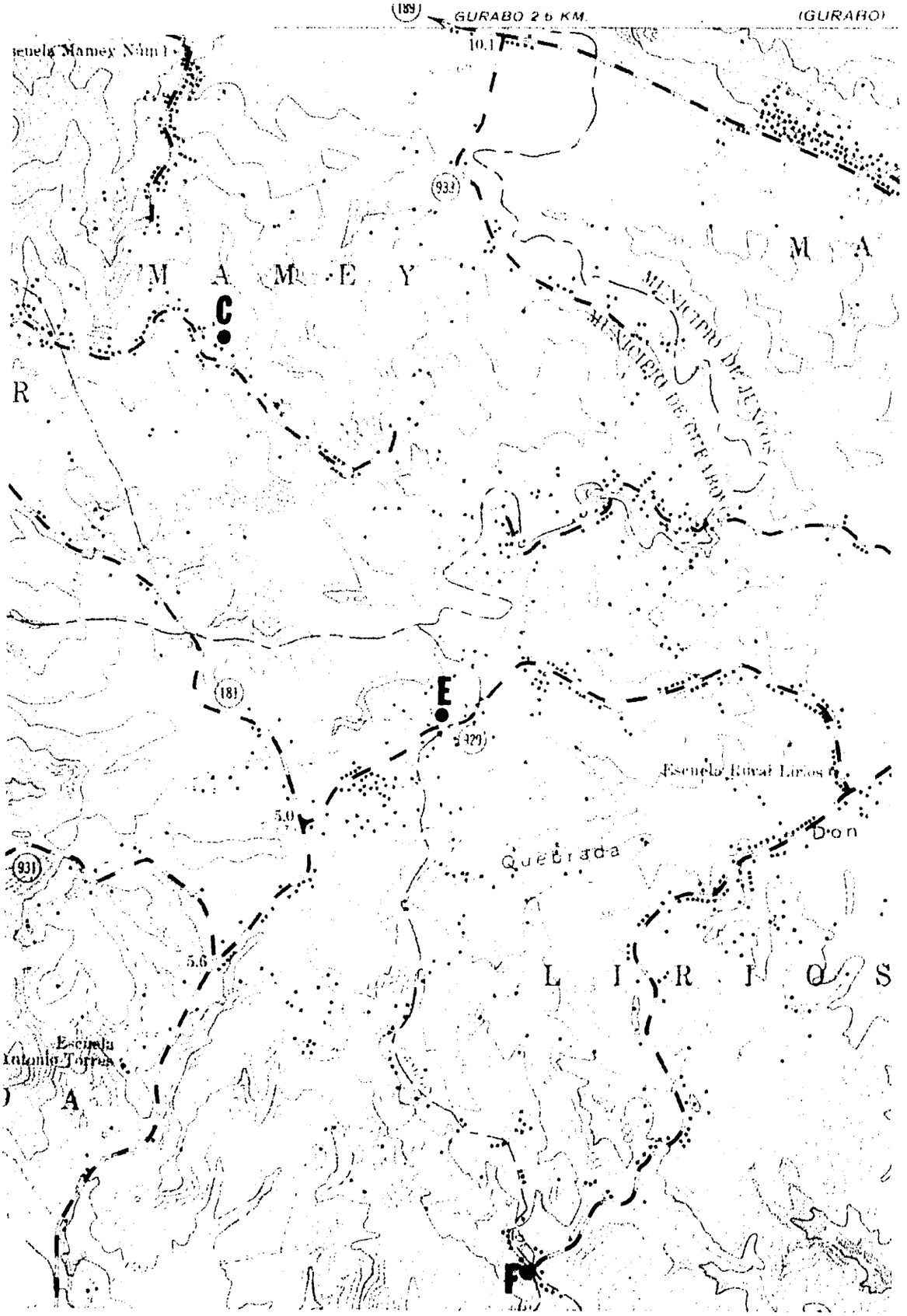
a. ☐ 1:25
b. ☐ 1:250
c. ☐ 1:2,500
d. ☐ 1:25,000

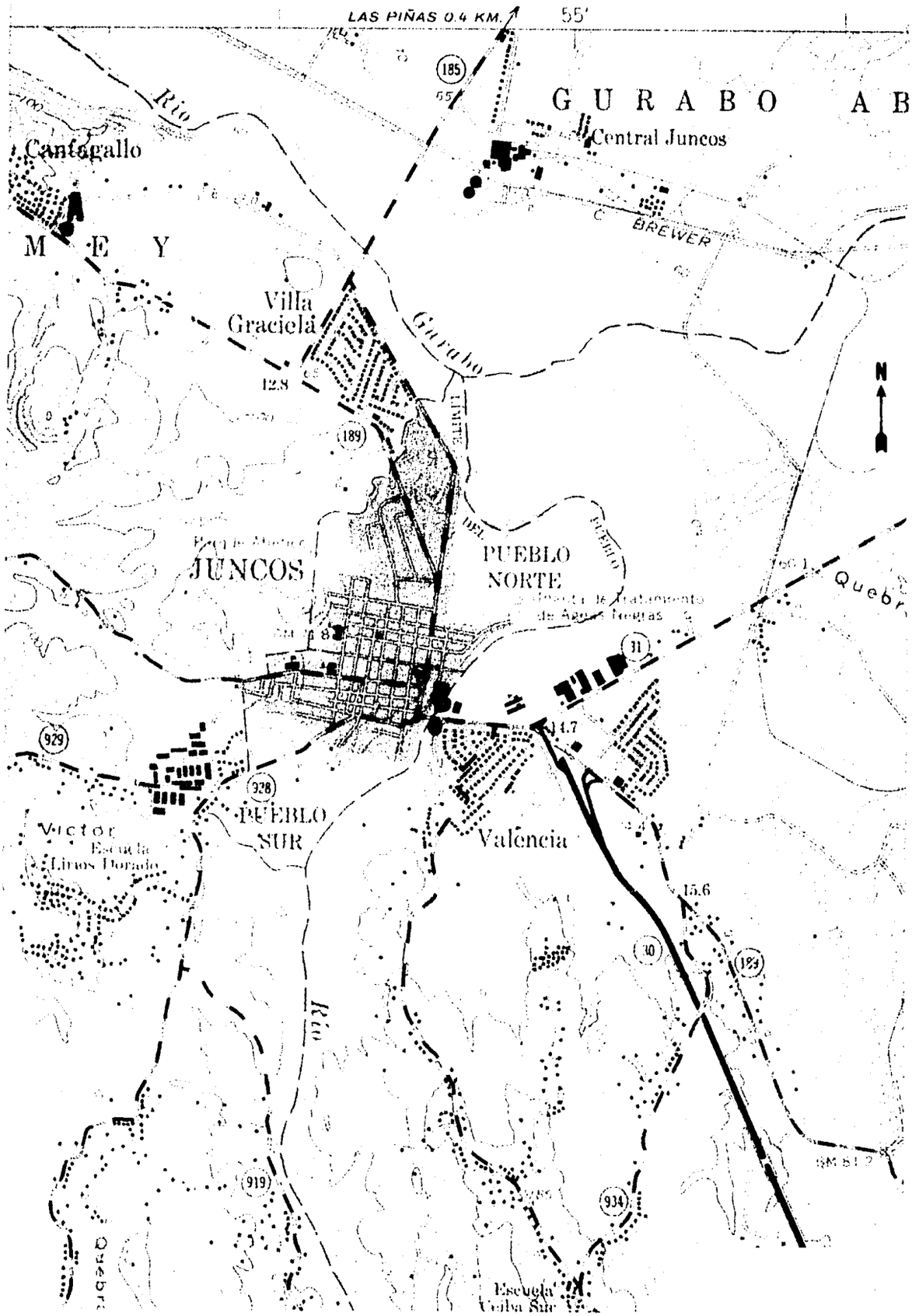
25. What is the shortest route from tract 203 to tract 303?

a. ☐ Ruta (route) 167
b. ☐ Ruta (route) 869
c. ☐ Ruta (route) 866
d. ☐ Caño Aguas Frias

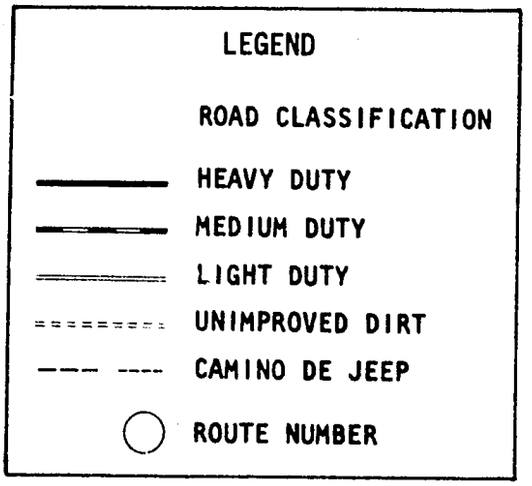
26. What would be the approximate distance if you traveled along Ruta (route) 167 from the southern boundary of tract 203 to the northern boundary of tract 303?

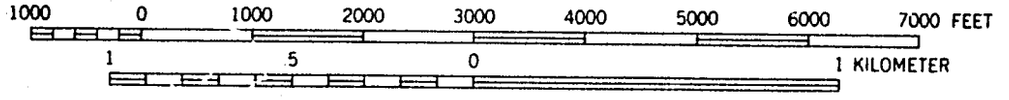
a. ☐ 2 km
b. ☐ 4 km
c. ☐ 6 km
d. ☐ 8 km
e. ☐ 10 km


189
GURABO 2 5 KM.
(GURABO)
10.1
933
M A M E Y
C
R
181
E
929
5.0
Escuela Rural Lirios
Don
Quebrada
931
5.6
L I R I O S
Escuela
Antonio Torres
A
F



Source: *U.S. Geological Survey.*





CONTOUR INTERVAL 10 METERS
DASHED LINES REPRESENT 5-METER CONTOURS
DATUM IS MEAN SEA LEVEL

Source: U.S. Geological Survey.

27. What is the scale expressed as a ratio?

_____

28. By car, how far is it from point A (Cantagallo) to point B (Valencia)?

a. ☐ 1.5 km
b. ☐ 2.5 km
c. ☐ 2.0 km
d. ☐ 3.5 km

29. What is the contour interval?

_____

30. The elevation of point C is (higher/lower) than point D.

31. What is the difference in elevation between point C and point D?

a. ☐ Less than 50 meters
b. ☐ 50-100 meters
c. ☐ 100-250 meters
d. ☐ 250-500 meters
e. ☐ More than 500 meters

32. Where is most of the flat land located?

a. ☐ Northeast
b. ☐ Southwest
c. ☐ Northwest
d. ☐ West

33. An automobile leaving Juncos and traveling west on Route 929 is going--

a. ☐ Uphill
b. ☐ Downhill
c. ☐ Perfectly level
d. ☐ Impossible to tell

34. In which direction does Río Gurabo flow?

☐ East
☐ South
☐ Southeast
☐ Northwest

35. On the map, mark the cemetery.

36. Where is the largest population concentration?

a. ☐ North
b. ☐ East central part
c. ☐ East
d. ☐ West

37. What is the distance from point E to point F by camino de jeep?

a. ☐ 2.25 km
b. ☐ 3.20 km
c. ☐ 1.25 km
d. ☐ 2.50 km

38. What is the distance from point E to point F using paved roads?

a. ☐ 3.25 km
b. ☐ 4.25 km
c. ☐ 5.25 km
d. ☐ 6.0 km

39. Refer to photo 3. Assume that the scale of the photo is 1:6,000 or 1 cm = .06 km on the ground. Using the parallel line method, calculate the area of the section of the photo which is outlined in black.

_____ km^2 or _____ m^2

QUESTIONS FOR DISCUSSION

40. What characteristics would you look for in a map that you would select for use in the census enumeration?

41. If you had a choice, would you select topographic or planimetric maps for census purposes. Why?

42. For measuring area, which system would you select: measuring with a polar planimeter, squares, dots, parallel lines, or other technique?

Chapter 4. AERIAL PHOTOGRAPHY

1. List four ways in which air photos can be used for census mapping.

   a. _____

   b. _____

   c. _____

   d. _____

2. In order to identify features on air photos, the user should learn to interpret--

   a. ☐ Shadows, tones, and texture
   b. ☐ Photo indexes
   c. ☐ Cloud formations
   d. ☐ Coastlines

3. Maps can be made from composites of several air photos which have been corrected for distortion and have had additional information added. These maps are called--

   a. ☐ Contour maps
   b. ☐ Topographic maps
   c. ☐ Orthophotomaps
   d. ☐ Relief maps

4. List three sources of air photos.

   a. _____

   b. _____

   c. _____

5. List three advantages and two disadvantages of using air photos in census mapping.

   Advantages: a. _____

   b. _____

   c. _____

   Disadvantages: a. _____

   b. _____

6. The scale of an air photo can be calculated by using camera height and focal length. The calculation requires the application of--

   a. ☐ Speed of the airplane
   b. ☐ Trigonometry
   c. ☐ Ground truth
   d. ☐ Geometry of similar triangles

7. If similar cameras are used, photos taken from an altitude of 10 km are (larger/smaller) in scale than photos taken from an altitude of 6 km.

8. The scale of an air photo can be calculated using the formula: $\text{scale} = \frac{1}{\frac{H-h'}{f}}$. Calculate the scale of a photo when--

   f = 0.2850 m

   H = 9,000 m

   h'= 450 m

   Scale = _____

9. Stereoscopes are primarily used for--

   a. ☐ Calculating the altitude of the plane
   b. ☐ Determining scale of air photos
   c. ☐ Locating HU's in wooded areas
   d. ☐ Identifying features

10. Why is it difficult to make a map from an oblique air photo?

    _____

    _____

11. For what type of area should side-looking airborne radar (SLAR) be used to obtain imagery? Areas that are--

    a. ☐ Continuously covered by clouds
    b. ☐ Very mountainous
    c. ☐ Very dry
    d. ☐ Very cold

12. List four major types of land cover (land use).

    a. _____
    b. _____
    c. _____
    d. _____

13. How should photos be held so that shadows can aid in the interpretation of features? The shadows should point--

a. ☐ To the left
b. ☐ To the right
c. ☐ Toward the reader
d. ☐ Away from the reader

14. How does a dry stream bed differ from a paved road? The stream b

a. ☐ Does not wind or meander
b. ☐ Is usually narrower than the road
c. ☐ Has an irregular width
d. ☐ Is usually wider than the road

15. A barn can usually be distinguished from a farmhouse by--

a. ☐ Its size
b. ☐ Its color
c. ☐ Its height
d. ☐ Its surrounding land use

For questions 16-22, match the letter on photo 1 with the description of the feature listed below.

16. _____ Power line

17. _____ Pond

18. _____ Farm buildings

19. _____ Divided highway

20. _____ Paved road

21. _____ Dirt road

22. _____ Fence row

For questions 23-26, refer to photo 1.

23. What proportion of the area is wooded?

a. ☐ 0 percent
b. ☐ 10 percent
c. ☐ 30 percent
d. ☐ 70 percent
e. ☐ 100 percent

24. Trace the route of the railroad (look for gradual curves, roads crossing bridges, and roads paralleling rather than meeting the railroad).

25. Circle the place where you think the major commercial area (central business district of the city is located.

26. If the scale of the photograph is 1:20,000, what is the distance from point A to point E?

_____

For questions 27-30, match the letter on photo 2 with the description of the feature listed below.

27. _____ Smoke from industrial building

28. _____ Parking lot

29. _____ Railroad yard

30. _____ Storage tanks

For questions 31 and 32, refer to photo 2.

31. What kind of bridge crosses the river?

a. ☐ Pontoon bridge
b. ☐ Drawbridge
c. ☐ Combination road and railroad bridge
d. ☐ Railroad bridge only

32. Using a colored pencil, draw a line separating the industrial area from the residential area shown on the west side (left side) of the river.

For questions 33-40, refer to photo 3. Using a colored pencil, indicate each of the following features by its key letter on the photo; enter the grid coordinates in the space below. A feature may appear more than once; indicate all of the locations.

	Key letter	Feature	Grid coordinates
33.	A	Bridge.....	_____
34.	B	Wooded ares.....	_____
35.	C	Railroad.....	_____
36.	D	Major public road.....	_____
37.	E	Private road to dwelling..	_____
38.	F	Power line.....	_____
39.	G	Stream.....	_____
40.	H	Fence row.....	_____

For questions 41-43, refer to photo 3.

41. Approximately how many farmhouses are visible in the photograph?

_____ farmhouses

42. Assuming that the roads are 5 to 10 meters wide and the farmhouses are 15 to 20 meters wide, what is the approximate distance from the top to the bottom of the photograph?

a. ☐ 20 meters
b. ☐ 200 meters
c. ☐ 2 kilometers
d. ☐ 20 kilometers

43. Observe the shadows cast by trees and buildings. If the area shown is in the northern hemisphere and the photograph was taken around noon, which is the north part of the photo?

a. ☐ Top
b. ☐ Bottom
c. ☐ Left
d. ☐ Right

For questions 44-49, refer to photo 4.

What is the principal land use in the part of the photo specified below?

Location	Forested hills	Fenced pasture land	Cultivated fields
44. Upper left	☐	☐	☐
45. Right portion	☐	☐	☐
46. Lower left and center part	☐	☐	☐

47. What kind of feature is represented by the irregular dark line A-A' running horizontally across the center of the photograph?

_____

48. What kind of feature is represented by the irregular dark line B-B' at the bottom center of the photograph?

_____

49. Using a colored pencil, outline the two major settlements.

For question 50, refer to photo 5.

50. Make a tracing of the photo. Use double lines for streets and roads, indicate location of landmarks (such as schools), and estimate the number of housing uni in each block.

For questions 51-57, refer to photo 8.

51. Which way is the stream at A flowing?

- a. ☐ To the right
- b. ☐ To the left

52. What is the linear feature at B?

- a. ☐ Highway
- b. ☐ Aircraft runway
- c. ☐ Boundary of military installat:
- d. ☐ Race track

53. The oval features at C and D are probably--

- a. ☐ Race tracks
- b. ☐ Swimming pools
- c. ☐ Tents
- d. ☐ Warehouses

54. The three features at E are--

- a. ☐ Tents
- b. ☐ Athletic fields
- c. ☐ Ponds
- d. ☐ Houses

55. With a colored pencil delineate the National Forest.

56. What are the rectangular feature, at F?

- a. ☐ Houses
- b. ☐ Barns
- c. ☐ Cultivated fields (garden plots
- d. ☐ Athletic fields

57. Approximately how many housing units are in the village at (

- a. ☐ 20
- b. ☐ 200
- c. ☐ 2,000
- d. ☐ 20,000

QUESTIONS FOR DISCUSSION

58. How would you train someone to interpret and use air photos?

59. For what parts of your country would you recommend that air photos be obtained for census mapping or planning? Why?

60. Would you recommend that air photos be used as EA maps in your next census? Why?

Chapter 5. MAP SKETCHING

1. If you wanted to measure decimeters for some purposes and centimeters for other purposes, what piece of equipment would be useful to you?

   a. ☐ Engineer's scale
   b. ☐ Compass card
   c. ☐ Protractor
   d. ☐ Surveyor's chain

2. A compass card is a necessity for map sketching. What is a compass card?

   a. ☐ Card on which a sketch is drawn
   b. ☐ Card on which the map sketcher enters azimuth readings
   c. ☐ Stiff card used as a writing surface
   d. ☐ Card scaled in degrees

3. List three major types of features which should be entered on a sketch map.

   a. _____
   b. _____
   c.

4. Assume that you paced between two points. The distance between them was 60 meters. You counted 77, 74, 70, 76, 78, and 75 paces for the six trips. What was your average length of pace?

   a. ☐ 1.25 meters
   b. ☐ 0.8 meter
   c. ☐ 0.6 meter
   d. ☐ 0.125 meter

5. In question 4, what was your average length of stride?

   a. ☐ 0.4 meter
   b. ☐ 0.3 meter
   c. ☐ 0.8 meter
   d. ☐ 1.2 meters
   e. ☐ 1.6 meters
   f. ☐ 2.5 meters

6. A compass reading (azimuth) is 30°. What is the correct backsight reading?

   a. ☐ 30°
   b. ☐ 150°
   c. ☐ 210°
   d. ☐ 330°

7. List four ways in which you can measure distances.

   a. _____
   b. _____
   c. _____
   d. _____

8. You are using a wheel to measure distances. The wheel measures exactly 1.4 meters in circumference. In traveling from A to B, the wheel turned 7½ times. What is the distance between A and B?

   _____ meters

9. Refer to columns 3, 6, and 7 of figure 5i in the manual. For the first five lines, what entries would you have in columns 6 and 7?

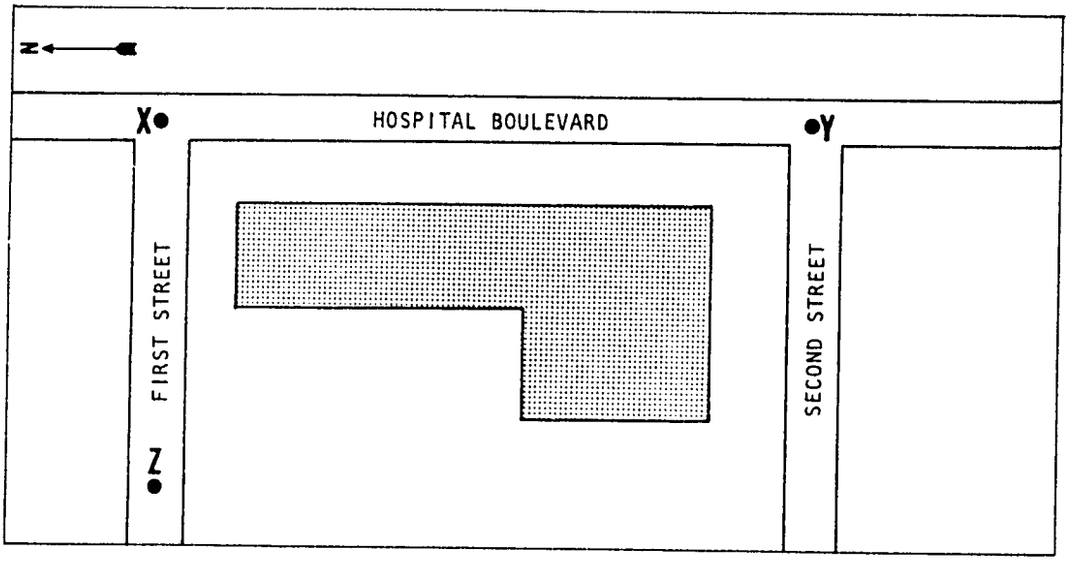
Paces	Length	Unit of measure
400	_____	_____
175	_____	_____
264	_____	_____
270	_____	_____
188	_____	_____

10. A map sketcher reported the following azimuth readings. Some are not acceptable and they should be verified in the field. Which of the following are acceptable for purposes of the census and which are not acceptable?

	Reading	Acceptable	Not acceptable
a.	AB 30° BA 212°	☐	☐
b.	BC 265° CB 87°	☐	☐
c.	CD 295° DC 109°	☐	☐
d.	DE 18° ED 187°	☐	☐

Refer to the sketch below to answer question 11.

11. With a protractor, locate the building with respect to points X, Y, and Z. Write the azimuth readings on the sketch for both the back and the front of the building.



For questions 12-15, match the two columns.

12. _____ Azimuth system

13. _____ Compass bearing system

14. _____ Error of closure

15. _____ Backsighting

A. Gap between the beginning and end of a closed traverse when the sketch is plotted

B. Taking the angular direction from the end of a straight line feature to the beginning of the line

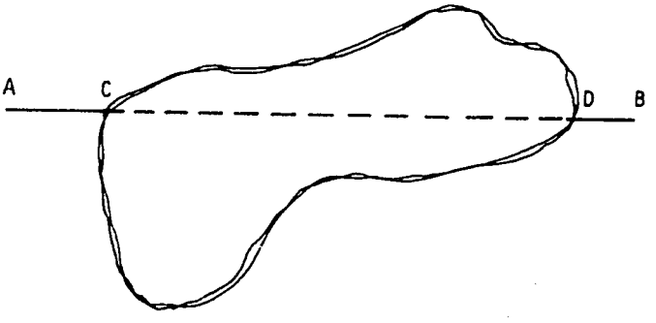
C. Walking or riding along a road and returning to the beginning point

D. Compass system using N, E, S, W

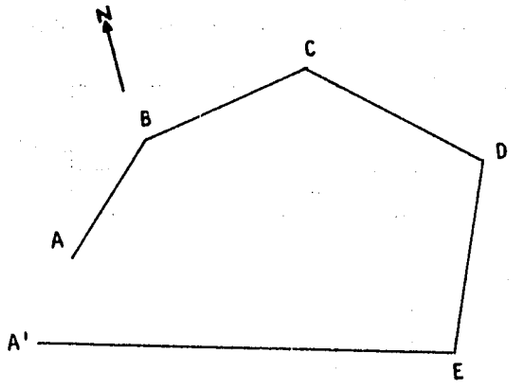
E. Compass system using 0° to 360°

F. Error in locating a boundary line

16. Below is a lake which interferes with your measurement of leg AB. You have no means for crossing the lake. Using parallel lines, illustrate how you would measure the width of the lake (line CD).



For questions 17-19, refer to the figure below.



17. Illustrate how you would adjust for the error of closure in the illustration above. Use the space to the right and below the figure.

18. Use a protractor to determine the azimuth reading for each of the five line segments before adjustment for error of closure.

a. _____ Line AB
_____ Line BA

b. _____ Line BC
_____ Line CB

c. _____ Line CD
_____ Line DC

d. _____ Line DE
_____ Line ED

e. _____ Line EA'
_____ Line A'E

19. Using a protractor, determine the bearings for each of the five line segments after adjustment for error of closure on the illustration you drew to answer question 17.

a. _____ Line AB

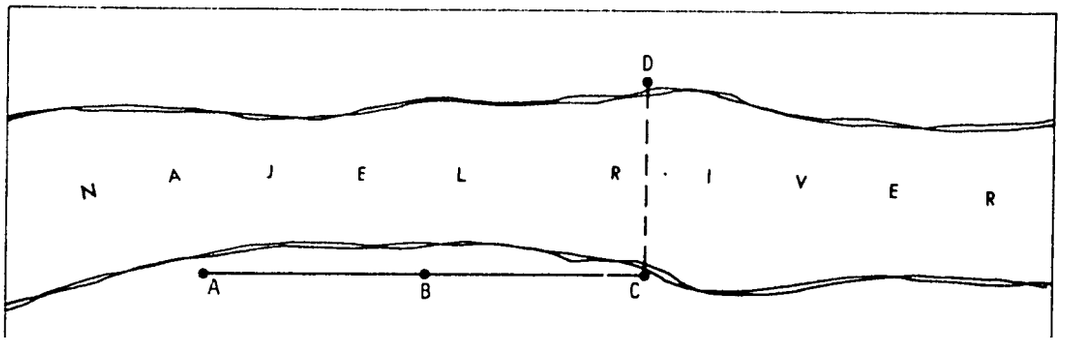
b. _____ Line BC

c. _____ Line CD

d. _____ Line DE

e. _____ Line EA

20. Illustrate how you would compute the distance across the river (CD). Assume that point D is a large tree and you can sight it from the other side.



21. On form GEO-201, the map sketcher recorded the following information. Use this information to construct the following map segments. Make a graphic scale for the map such that 1 cm represents 50 meters. Convert paces to meters, assuming 1 pace = 0.8 meter.

Leg	Azimuth	Paces	Length	Comments
AB	90°	138		A 30° to barn door; 60° to school door
BA	270°			B 305° to barn door; 355° to school door
BC	170°	200		
CB	350°			
CD	250°	262		
DC	70°			

QUESTIONS FOR DISCUSSION

22. **The existing map for a part of a district is much out of date. Would you make a sketch map or correct the old map?**

23. **Under what circumstances would you make sketch maps, rather than use air photos or other materials?**

24. **The map sketcher is instructed to provide estimates of HU's, in addition to the information for the sketch. Of what use are the HU estimates?**

Chapter 6. PREPARATION OF BASE MAPS

1. What is the principal purpose of a base map?

_____

_____

2. What essential features should be shown on base maps for sparsely settled areas?

a. _____

b. _____

c. _____

3. What essential features should be shown on base maps for densely settled areas?

a. _____

b. _____

c. _____

4. Maps for large cities often are not suitable for use as base maps for a census. Why?

_____

_____

5. One of the first steps in preparing base maps is to make a list of areas. This list should include--

a. ☐ All administrative areas of the country

b. ☐ All administrative and all statistical areas of the country

c. ☐ All administrative and all statistical areas for which data are to be tabulated

d. ☐ All geographic areas of the country

6. After the geography staff completes the list of areas, how is it verified?

a. ☐ Have the supervisory NSO staff check the list

b. ☐ Compare with the list for the previous census

c. ☐ Arrange it in alphabetical order

d. ☐ Ask local officials to review the list

7. In figure 6a in the manual, Cuta barrio in Antigua district is coded 06 and Doreta barrio is coded 09. Why is there a gap between code 06 and 09?

   a. ☐ The missing codes are reserved for large cities
   b. ☐ Codes 07 and 08 are assigned to another district
   c. ☐ Barrios 07 and 08 will not be tabulated
   d. ☐ Allows for addition of barrios that fall (alphabetically) between Cuta and Doreta

8. One item is missing from the codes in figure 6a. What is that item?

   a. ☐ Code for rural balance
   b. ☐ Code for EA
   c. ☐ Code for city
   d. ☐ Code for subdivision of a city

9. In figure 6a, how were the codes assigned for Beri hamlet, Tori hamlet, Casseta city, and other places?

   _____

   _____

10. Assume that barrios are to be coded within districts. One district has 143 barrios; the remaining districts have 92 or fewer barrios. How many digits should be allowed for coding barrios?

    _____

11. After the list is compiled and coded, the geography staff should decide which areas have priority in acquiring and preparing maps. Indicate the recommended priority for the following areas, using "1" for the highest priority.

    _____ The capital city
    _____ A village which is to be used in a census pretest
    _____ Rural area near the capital city; old census maps available in the files
    _____ Rural areas near the capital city; no maps available in the files
    _____ Large tribal territory with sparse population

12. In preparing the map inventory, what forms are useful? Select three from the following list.

    a. ☐ Air photo
    b. ☐ Map catalog card
    c. ☐ Inventory card
    d. ☐ Resource material
    e. ☐ EA listing
    f. ☐ Index map

13. As mapping materials are acquired, it is suggested that the inventory be--

a. ☐ Re-organized
b. ☐ Kept up-to-date
c. ☐ Taken again
d. ☐ Discontinued until the next census or other statistical undertaking

14. Air photos (should/should not) be included in the inventory.

15. Refer to figure 6b in the manual. How many--

a. _____ Districts had no maps or air photos
b. _____ Districts had complete urban coverage
c. _____ Districts had complete rural coverage

16. List at least four things to look for when evaluating maps.

a. _____
b. _____
c. _____
d. _____

17. The following table lists different types of maps (or air photos) which will be used as EA base maps. Indicate with an X what type of change you would recommend.

Type of area	Scale	Enlarge	Reduce	No change
a. Densely settled agricultural area.....	1:100,000	.... ☐	..... ☐	..... ☐
b. Slum area in a city.....	1:10,000	.... ☐	..... ☐	..... ☐
c. Small hamlet.....	1:1,000	.... ☐	..... ☐	..... ☐
d. Sparsely settled tribal area.....	1:1,000,000	.... ☐	..... ☐	..... ☐

18. Name ten or more sources that you would contact for mapping materials.

a. _____ f. _____
b. _____ g. _____
c. _____ h. _____
d. _____ i. _____
e. _____ j. _____

19. Although it is not always possible, it is desirable to use double lines for streets or roads. List three advantages in using double lines.

a. _____

b. _____

c. _____

20. You decide that the map scale is too small and it has too much detail. What solution would you recommend?

a. ☐ Enlarge the map by means of photography
b. ☐ Enlarge the map and remove unnecessary detail
c. ☐ Draft a new map
d. ☐ Remove unwanted features

21. One of the most common and desirable maps that can be used as a base map for a rural area is a--

a. ☐ Topographic map
b. ☐ Planimetric map
c. ☐ Highway planning map
d. ☐ Water project map

22. As a general rule, which source materials should the compiler review first?

a. ☐ Maps from the previous census
b. ☐ Newest maps available
c. ☐ Statistical maps
d. ☐ Current air photos

23. Refer to exhibit 6-6. What materials were the principal map sources?

a. Primary source: _____

b. Supplementary source: _____

24. Which material should the compiler select as the primary source?

a. ☐ Map with the most features
b. ☐ Recent air photo
c. ☐ Map with the largest scale
d. ☐ Map with most of the needed information

25. Who prepares the instructions on how to use the materials in the map package?

a. ☐ Draftsman
b. ☐ Chief cartographer
c. ☐ Compiler
d. ☐ Training specialist

26. List four specific instructions that may be found in a map package.

a. _____

b. _____

c. _____

d. _____

27. What is the purpose of asking local officials to divide areas into sectors and provide HU estimates?

_____

_____

28. In what other ways can local officials help with mapping activities?

a. _____

b. _____

c. _____

d. _____

29. With respect to boundary changes, which decision would you recommend and why: (a) establish a cut-off date about 1 year before the census or (b) accept boundary changes up to 1 month before the census enumeration?

_____

_____

_____

30. What is the average amount of space required for compilers to spread out several maps at a time?

a. ☐ 1¼ meters by 1 meter
b. ☐ 5 to 9 square meters
c. ☐ 2 meters by 1 meter
d. ☐ 5 meters by 9 meters

31. List four rules with respect to handling and storing maps.

a. _____

b. _____

c. _____

d. _____

32. Which system do you think would work better: (a) assign one person (or group) to evaluate and compile all the mapping materials for an area or (b) assign one person (or group) to handle all the urban maps, another to handle all the rural hamlets, another to handle the remote areas, etc.? Why?

_____

_____

_____

QUESTIONS FOR DISCUSSION

33. It takes time to set up a priority list for acquisition of maps. Is it worth the time? Explain.

34. Assume that you do not have time to make a list of all administrative areas before the census enumeration begins. What problems would you expect to have if you make the list when completed census questionnaires are received in the NSO?

35. For preparing map packages, what administrative level would you use as the unit of control? Why?

36. What is the advantage of specialization in the mapping tasks carried out at the NSO? Would you recommend specialization for your office?

Chapter 7. DELINEATION AND CONTROL OF ENUMERATION AREAS

1. Arrange the following steps in order, starting with "1" as the first operation.

   _____ Make copies of individual EA maps
   _____ Delineate EA's
   _____ Draft the base map
   _____ Prepare the map package

2. If the census planners want to complete the census enumeration in 5 working days and if the average rural enumerator completes 10 interviews per day, what is the ideal EA size for rural areas?

   a. ☐ 40
   b. ☐ 50
   c. ☐ 75
   d. ☐ 100

3. If the urban interviewer averages 15 interviews per day and the census enumeration is to be finished in 5 days, what is the ideal EA size for urban areas?

   a. ☐ 50
   b. ☐ 75
   c. ☐ 100
   d. ☐ 160

4. When can EA's be large in area? They may be large when--

   a. ☐ Rural enumerator can travel easily by car
   b. ☐ Located in a congested urban area
   c. ☐ Terrain is difficult
   d. ☐ Enumerator travels on foot

5. The staff should follow certain guidelines when delineating EA's. Which of the following is one of them?

   a. ☐ As a rule, do not use statistical area boundaries
   b. ☐ Use invisible lines when convenient
   c. ☐ Request local officials to delineate EA's
   d. ☐ Balance population size with land area and ease of travel

6. List some advantages and disadvantages of making small EA's.

Advantages: a. _____

b. _____

c. _____

Disadvantages: a. _____

b. _____

c. _____

7. List some advantages and disadvantages of a large EA.

Advantages: a. _____

b. _____

c. _____

Disadvantages: a. _____

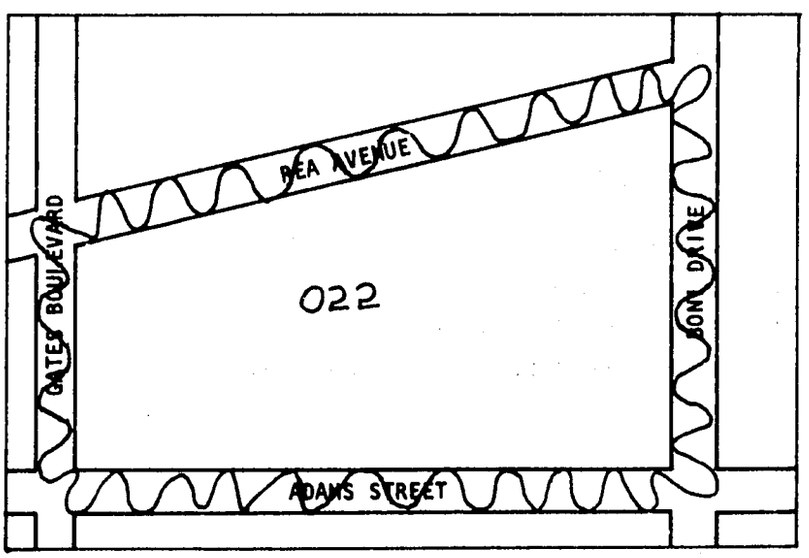
b. _____

c. _____

8. A larger-than-average EA, in terms of population, may be permitted if--

a. ☐ The EA consists of one large housing development
b. ☐ A high rate of callbacks is expected
c. ☐ The terrain is hilly
d. ☐ It is an area of rapid population growth

9. When the field inspection was carried out, the supervisor found a new hospital had been constructed in the southwest corner of the EA. Indicate the location of the hospital and how it would be identified. Assume that EA 022 was the last EA in the barrio.



For questions 10-12, match the two columns.

10.	_____	Split EA	A. Size that enables enumeration to be completed in the desired time
11.	_____	Special EA	B. A138 and B138
			C. 138A and 138B
12.	_____	Ideal EA	D. School for the deaf

13. Local officials can be very helpful in the census mapping operations. List three things they can do that relate to EA delineation.

a. _____

b. _____

c. _____

14. Refer to the left illustration in figure 7b in the manual. An enumerator wishes to walk entirely around his EA. If he walks steadily at 2 km per hour, how long will it take?

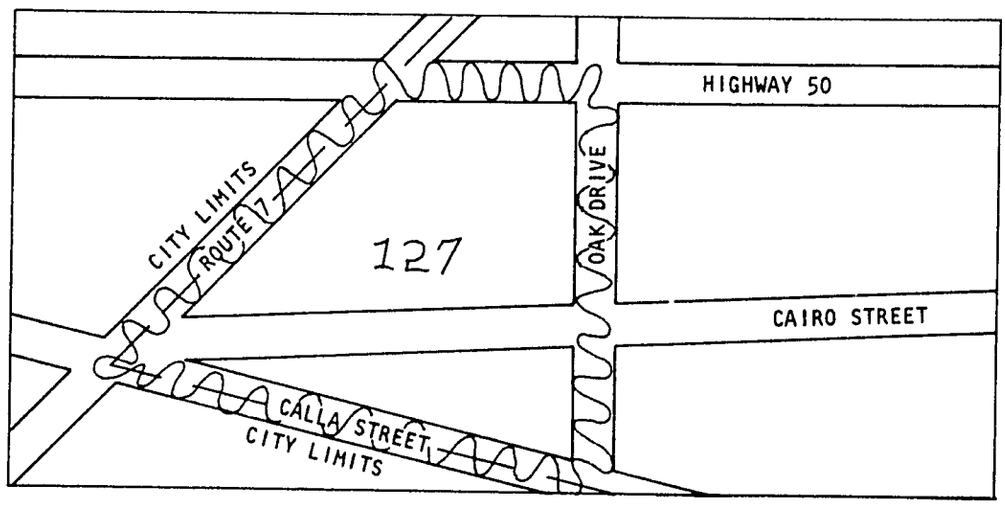
a. ☐ 55 minutes
b. ☐ 110 minutes
c. ☐ 1¼ hours
d. ☐ 2½ hours

15. When the crew leader reviewed a map before giving it to an enumerator, he discovered an error--the city boundary is CAIRO STREET, not CALLA STREET. There is not enough time to send the map back to the NSO. How should the crew leader handle the situation?

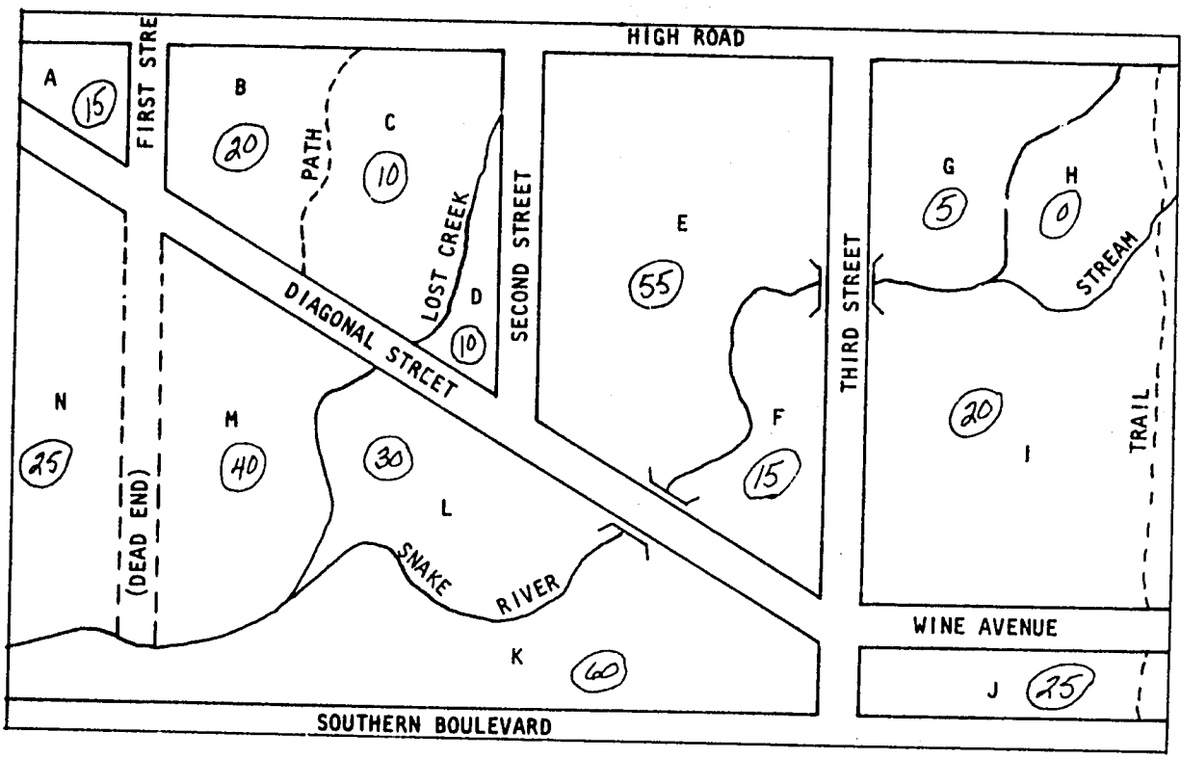
_____

_____

Mark on the illustration the corrections the crew leader should make.



16. Below is a rough sketch of an area that was divided into sectors. The circled figure in each sector is an estimate of HU's. For convenience of this exercise, assume that the edge of the map is a barrio boundary. Using the form, construct EA's of approximately 100 HU's each. Assume the river can be crossed only where the two bridges are located. Use each sector only once. Draw the EA boundaries.



Sector	HU estimate	Total HU in EA*	EA number*	Sector	HU estimate	Total HU in EA*	EA number*

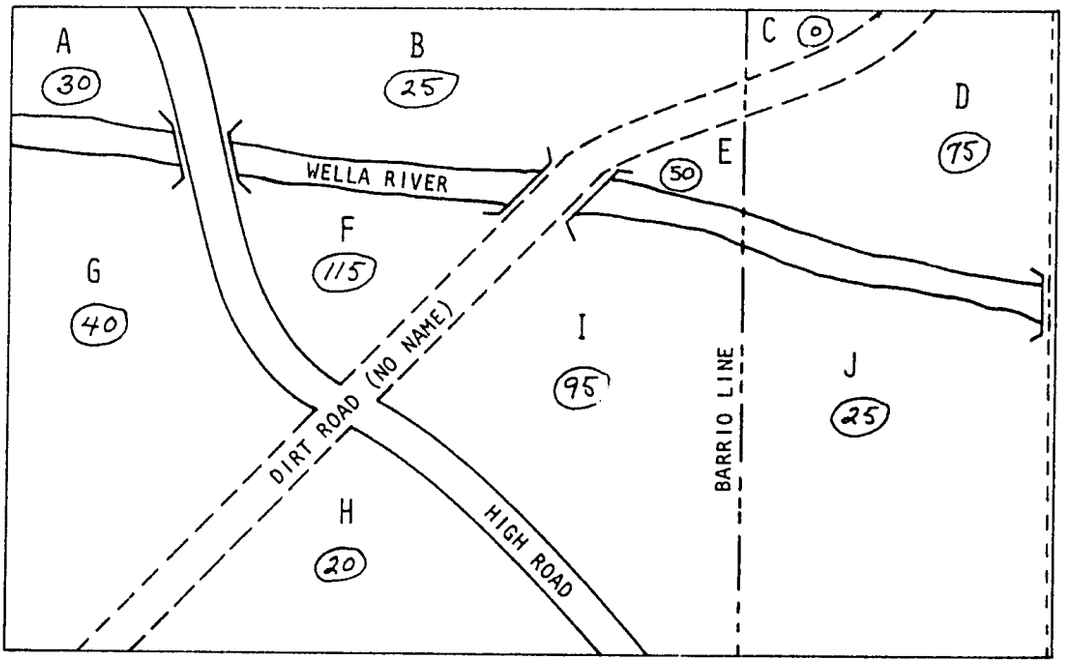
*Enter total HU and EA number on the line for the last sector in the EA.

17. How can the Master List of EA's (Form GEO-501) be used as a master control for other operations, such as key punching?

_____

_____

For questions 18-23, refer to the illustration below. The map has been divided into sectors. Assume that the average EA will contain about 100 HU's and the edges of the map represent sector boundaries. Assume also that data are to be published by barrio.



Could you combine the following EA's and what is the reason for your decision? Consider each part as a separate question; thus the same sector may be mentioned more than once.

	Would you--	Yes	No	Reason
18.	Combine B, C, and D into one EA....	☐	☐	_____
19.	Combine A, G, and H into one EA....	☐	☐	_____
20.	Combine D and J into one EA.....	☐	☐	_____
21.	Join F with any other sector.....	☐	☐	_____
22.	Combine J, H, and G.....	☐	☐	_____
23.	Combine C, D, and E.....	☐	☐	_____

24. In one case, the census staff decided on an unbroken numbering sequence for EA's in a 2nd order division--first all the urban places, then the rural. What would be the disadvantage of this proposal?

_____

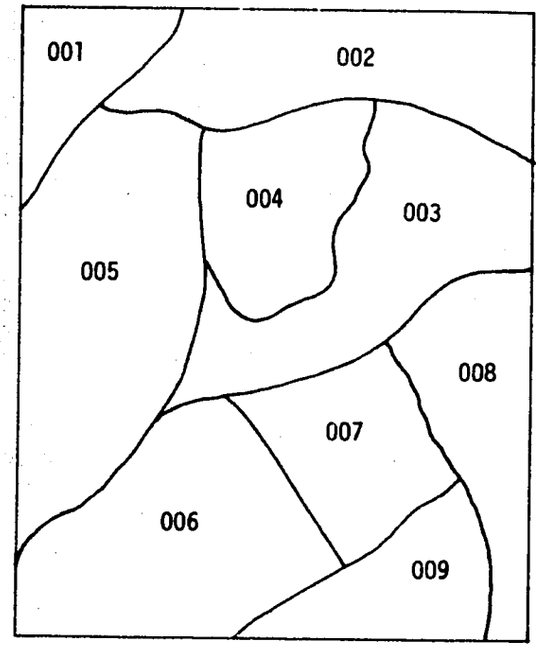
_____

25. Very large cities are likely to have more than 1,000 EA's. What numbering scheme could you use to avoid 4-digit EA numbers?

_____

_____

26. The diagram below shows a simplified EA base map containing EA's 001 to 009. For the cut-out procedure, calculate the smallest number of sheets needed to reproduce a separate map, with some periphery, for each EA. Count only the number of maps needed for enumerators, not the maps needed for crew leaders or for office use.



Copy no. EA no.

27. After the EA's are delineated on the base map, a copy of the base map must be cut up so that each enumerator will have a separate map. If the cutter is careful to cut along EA boundaries, only one copy of the base map is needed. This could save making extra copies. What is the disadvantage of cutting the EA's from one copy?

_____

_____

_____

TURN TO PAGE 57 FOR CONTINUATION OF CHAPTER 7

PHOTO 1

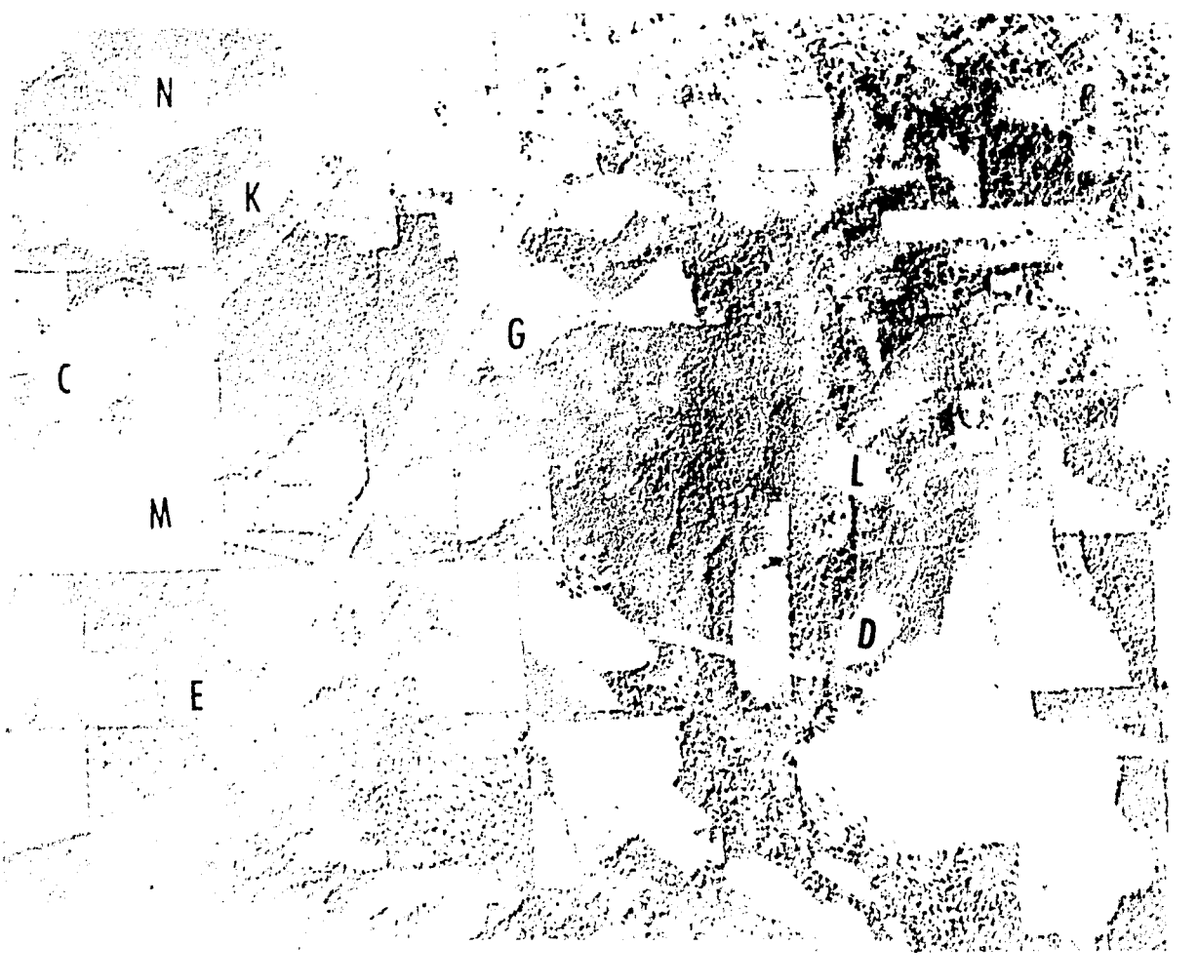
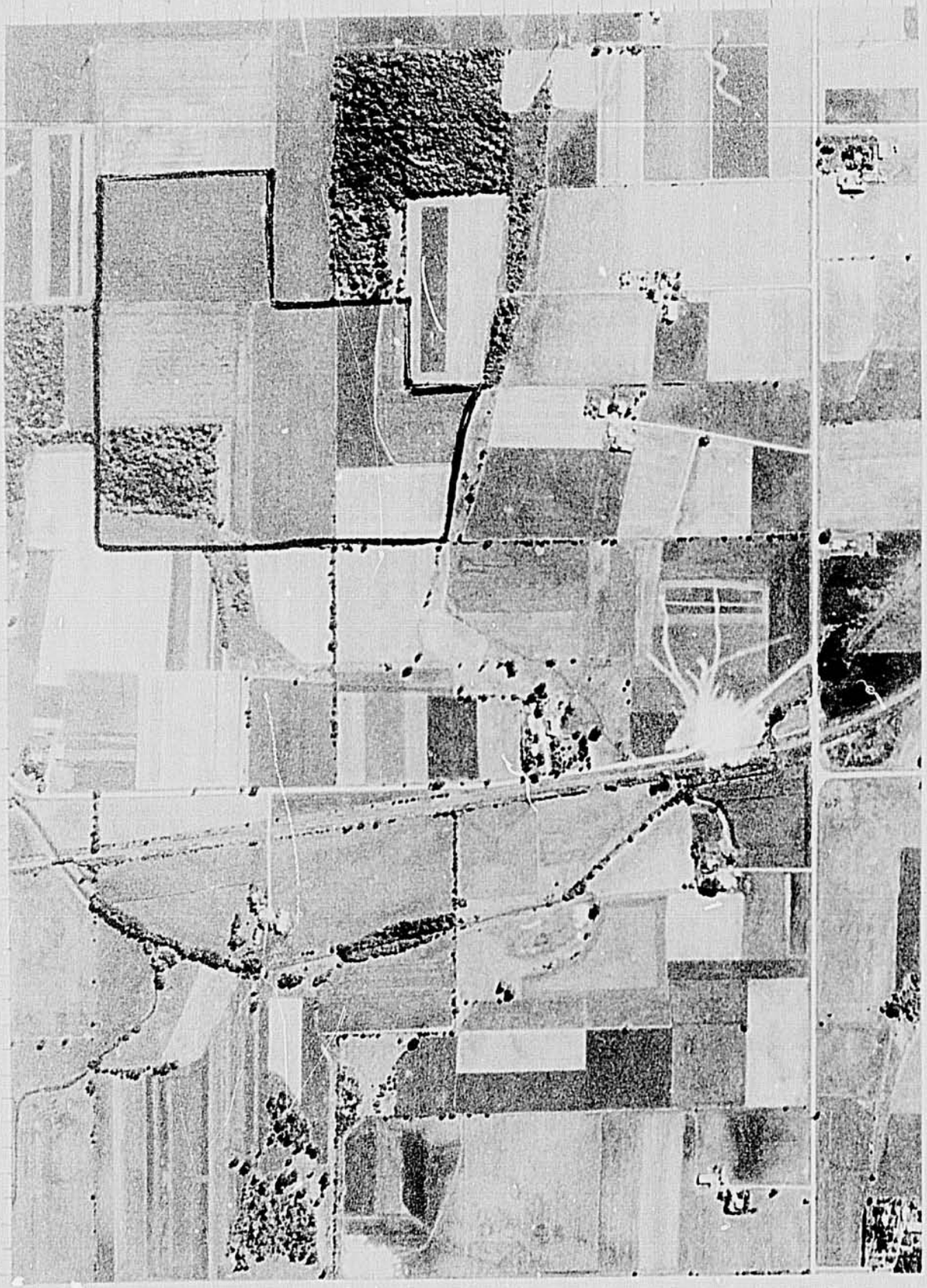


PHOTO 2

PHOTO 3

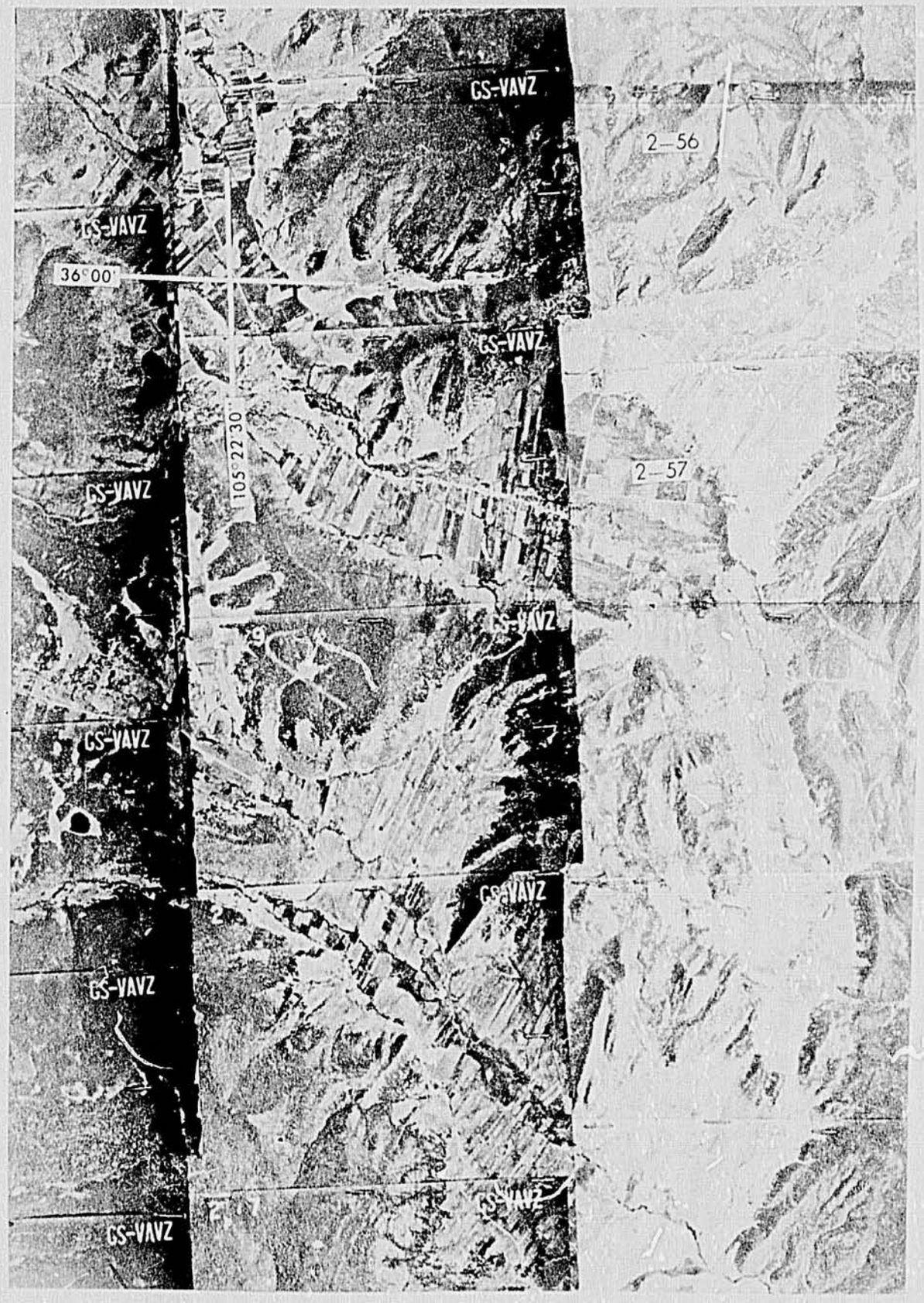


Source: U.S. Department of Agriculture.

PHOTO 4

Source: U.S. Geological Survey.

PHOTO 6



Source: U.S. Geological Survey.

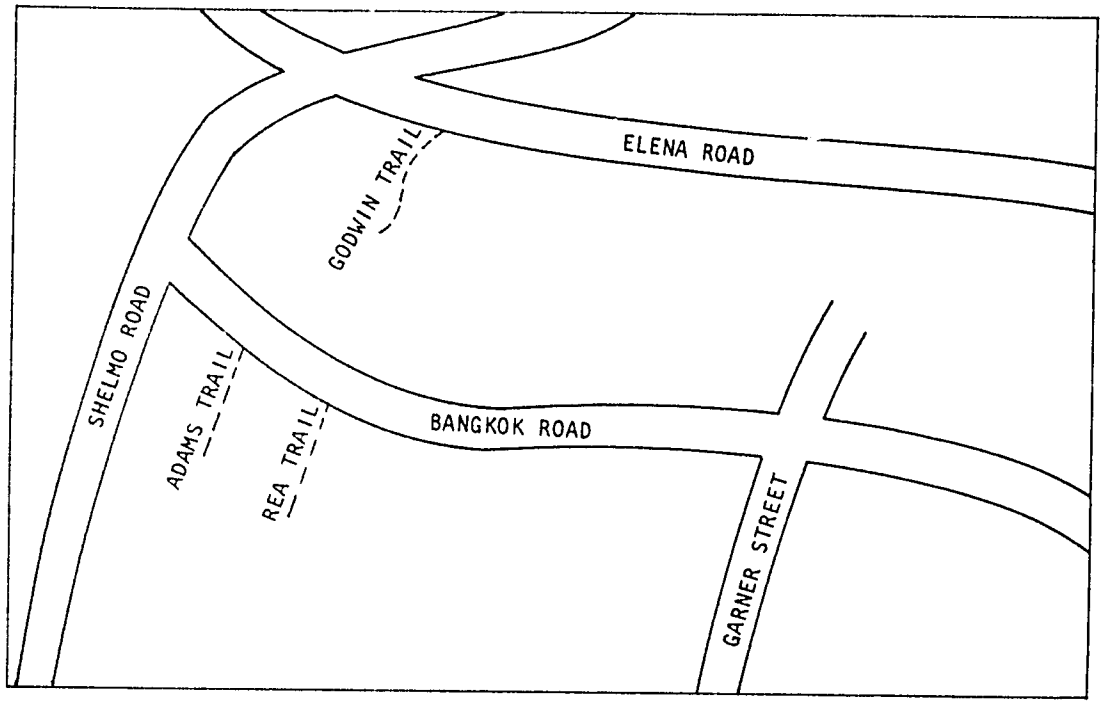
PHOTO 7

Source: U.S. Geological Survey.

PHOTO 8

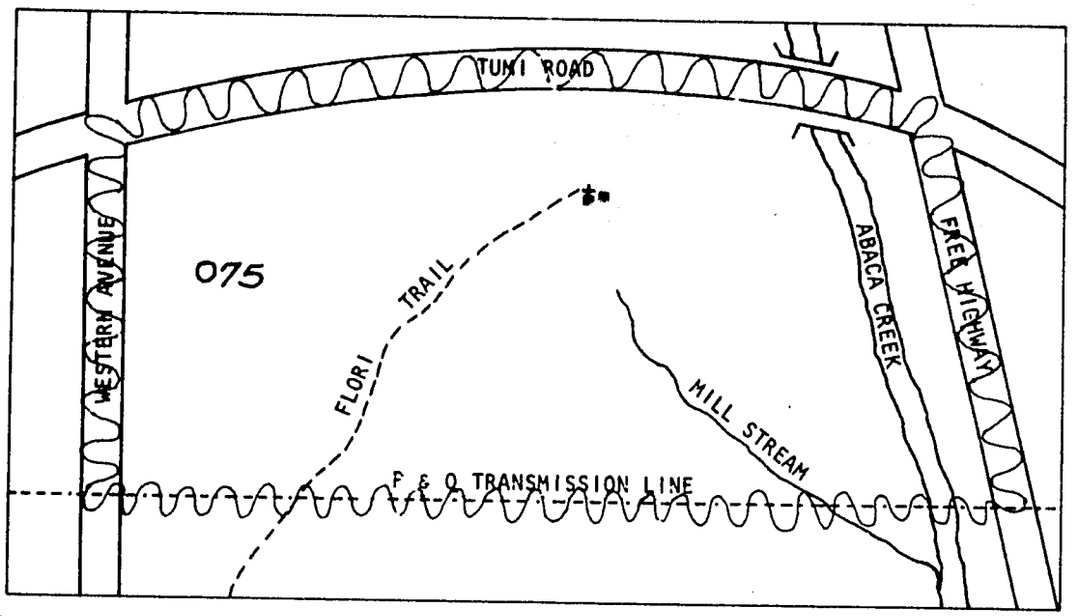
Source: U.S. Department of Agriculture.

28. On the map below, delineate two EA's. Use Shelmo Road, Elena Road, Bangkok Road, and Garner Street as EA boundaries. If necessary, use extended lines, offset lines or point-to-point lines.



29. Sketch a piece of a rural area that contains a small city. The map scale is too small to use an enumeration map for the small city. Sketch a map for the city. Draw the tie-in lines on your maps.

30. Below is a sketch of EA 075. The field supervisor found that much new housing was recently built along Tumi Road and the EA must be split. For this purpose, select either Flori Trail or Mill Stream and draw an extended line to divide the EA. Label the EA's.



a. Which feature did you select to divide the EA and why?

_____

_____

b. How did you number the two EA's?

_____ and _____

For questions 31-35, match the terms in the left column with the appropriate statement in the right column.

31. _____ Sector

32. _____ Offset line

33. _____ Serpentine system

34. _____ Tie-in line

35. _____ Wiggly line

A. Imaginary line connecting two visible features and running parallel to a linear feature

B. EA boundary symbol

C. Small subdivision of an area for which HU or population estimate is provided

D. EA numbering arrangement

E. Special dwelling place

F. Boundary of urban areas shown on a rural map

G. Symbol for power line

36. A bright color for the EA boundary is helpful to the enumerator. On how many copies should the EA boundary be colored?

a. ☐ On all copies of EA maps
b. ☐ On the enumerator's, crew leader's, and office copies
c. ☐ On the enumerator's and crew leader's copies
d. ☐ Only the enumerator's copy

37. Of the entire mapping program staffs, which has the heaviest burden to prepare for a census?

a. ☐ Base map compilation staff
b. ☐ EA delineation staff
c. ☐ Statistical areas staff
d. ☐ Drafting staff

QUESTIONS FOR DISCUSSION

38. How would you proceed to get HU or population estimates so you could delineate EA's? Would you have local officials delineate EA's?

39. Would you recommend that EA boundaries be retained from census to census?

40. What are the risks of delineating EA's without current estimates of population (or HU's)?

41. How could you use the "assembly line" arrangement in the EA delineation operation?

Chapter 8. USE OF MAPS IN THE ENUMERATION

Refer to exhibit 8-1 in the manual. In the spaces to the left of the question below, write the answers to the following pre-training test questions.

1. _____ How many blocks are in your area?

2. _____ There is a house on the southeast corner of River Road and High Street. Is this house in your work area?

3. _____ How many bridges are there east of Route 12?

4. _____ One cm on the map represents 100 meters on the ground. If point A on the map is 3½ cm from point B, what is the actual (ground) distance from point A to point B?

5. _____ A man on a bicycle rode 60 km in 5 hours. On the average, how many km did he ride in 1 hour?

6. Skills which a person should have before he is accepted for a job in the field are called (pre-training/post-training) skills.

7. The field staff needs certain skills in order to use maps effectively. In the following spaces, enter PRE for pre-training and POST for post-training skills.

   a. _____ Update maps

   b. _____ Follow written instructions

   c. _____ Identify EA boundaries

   d. _____ Do simple arithmetic

   e. _____ Carry out a systematic canvass

   f. _____ Follow features on a map

8. A rural EA map shows 17 houses. Recently, 4 new houses were built within the EA. How many houses should the enumerator visit?

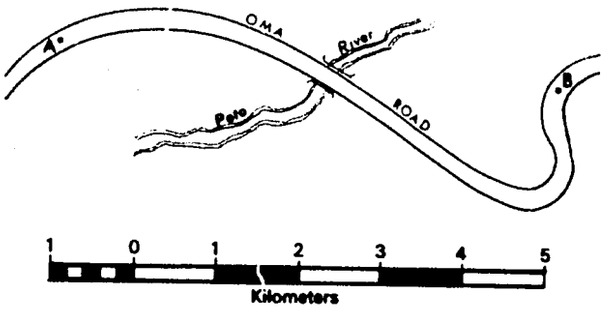
   a. ☐ 4
   b. ☐ 21
   c. ☐ 17
   d. ☐ 13

9. Usually a map has a directional arrow. There are some exceptions. What is one exception?

10. Which is the simplest scale for the enumerator to use?

a. ☐ Ratio
b. ☐ Fraction
c. ☐ Word statement
d. ☐ Graphic

11. Approximately how far would an enumerator travel from point A to point B? (Note the placement of the 0 point on the scale.)



a. ☐ 5.0 km
b. ☐ 6.0 km
c. ☐ 7.8 km
d. ☐ 8.2 km

12. Crew leaders need to know the location and boundaries of the EA's in their CL areas. One solution is to give them a copy of each EA map. What is the disadvantage of this solution?

_____

_____

13. Refer to figure 8a in the manual. You are proceeding north on Rite Road looking for the SE corner of the EA. When you come to Limon Trail, how far must you travel to reach the SE (southeast) corner of the EA?

a. ☐ 200 meters
b. ☐ 115 meters
c. ☐ 100 meters
d. ☐ 650 meters

14. There are several basic rules for training enumerators. One rule is to "Be prepared." List five others.

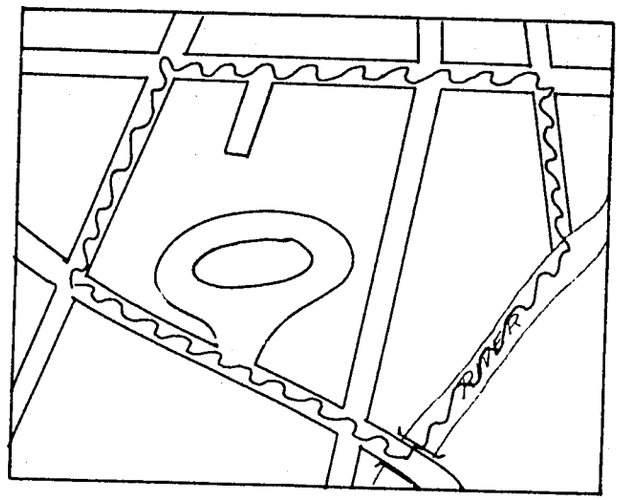
a. _____
b. _____
c. _____
d. _____
e. _____

15. When training a large number of enumerators, a verbatim guide is recommended. What is the difference between a verbatim guide and an outline guide?

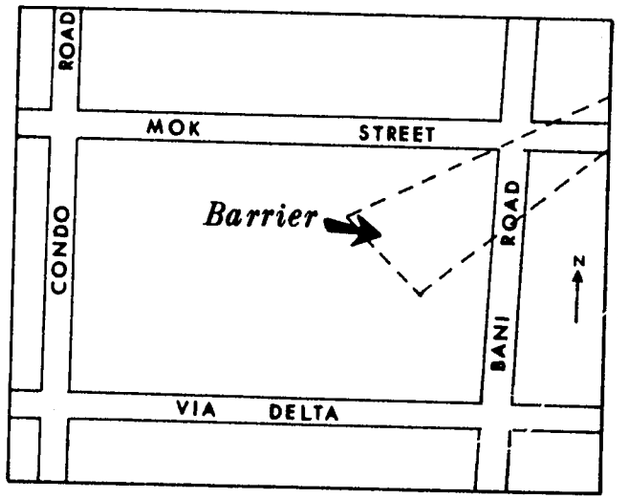
Verbatim guide: _____

Outline guide: _____

16. In the EA illustrated below, use arrows to indicate your route of travel.



17. In the example, you are canvassing a city block. As you walk east on Mok Street, you come to a construction barrier and cannot proceed on Bani Road. How would you complete the enumeration of your block?



_____

_____

_____

_____

_____

_____

_____

_____

18. In figure 8e of the manual, describe the boundaries of EA 025A.

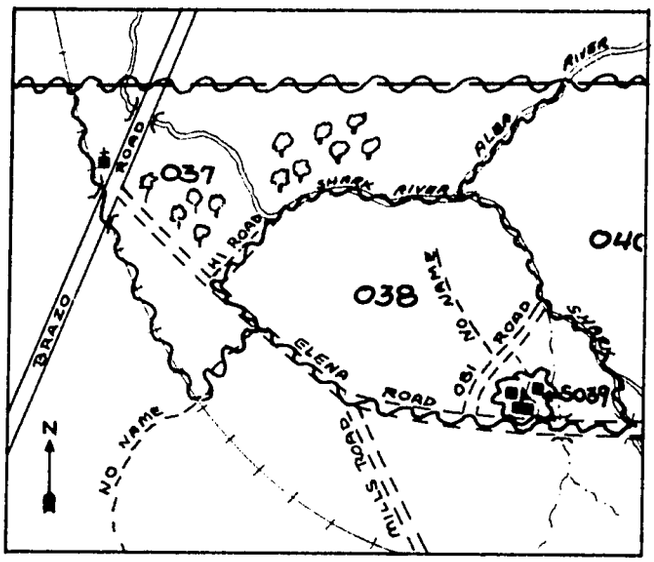
North boundary _____

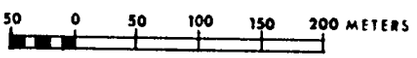
East boundary _____

South boundary _____

West boundary _____

Refer to the sketch map below to answer questions 19 to 27.





LEGEND

Perennial stream	Bridge
Intermittent stream	Church
Woodland	School
Hard surface road	Barrio boundary
Dirt road	EA boundary
Trail	038 EA number
Railroad	

19. Indicate the quality (kind) of road for each of the following:

    a. Brazo Road _____

    b. Mills Road _____

20. Shark River is a _____ type of stream.

21. Southwest of Elena Road, Brazo Road intersects what other man-made feature?

    _____

22. What type of building is located immediately northwest of the intersection of Brazo Road and Elena Road?

    _____

23. According to the map legend, what is the cluster of buildings just north of Elena Road near the east margin of the map?

_____

24. Using the map scale, calculate the ground distances between the following points:

a. _____ (meters) From the intersection of Mills Road and Elena Road to the intersection of Hi Road and Elena Road.

b. _____ (meters) From the bridge over Shark River to the railroad.

c. If the length of your pace is 0.8 meter, how many paces would it be from Hi Road to Brazo Road?

_____ paces

25. The north boundary of EA 037 is an imaginary boundary (barrio boundary). Indicate two ways in which the boundary can be established by the enumerator.

a. _____

b. _____

26. Assume that you are standing at the intersection of Elena Road and Brazo Road facing northeast. With your map in the correct field orientation, what feature would you see--

a. On your right? _____

b. On your left? _____

27. During the canvass of EA 038, you note that several corrections need to be made on the map. Make the following changes on the sketch, using the symbols explained in chapter 8 of the manual.

a. An unnamed dirt road extends southeast from the intersection of Hi Road and Shark River to Elena Road meeting it at a point 100 meters southeast of the intersection of Hi Road and Elena Road. Enter this road on the map and provide a suitable designation for it.

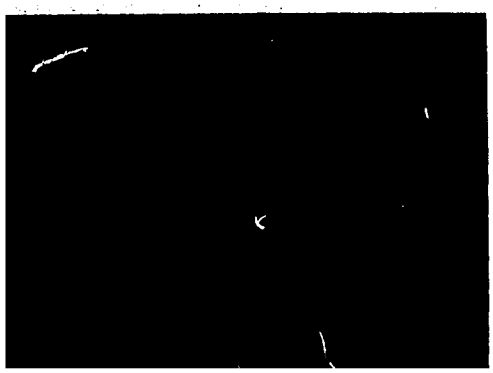
b. The trail extending northwest from Obi Road has a name sign which reads "River Road." The trail extends north to the river. A new road exists on the southwest side of the trail 75 paces from the intersection of River Road and Obi Road; the new road extends to the intersection of Elena Road and Mills Road. Make the changes on the map. (Assume one pace = 0.8 meter.)

28. Why are Large Special Dwelling Places made separate EA's?

29. What is meant by the statement "The EA boundary is like a fence around your own private territory"?

30. Where would you find instructions on how to canvass apartment buildings?

31. Below are two slides of a training filmstrip. The first shows blocks within an EA and the second shows a map legend. Assume that you are training enumerators in the use of maps and how to canvass. List four or five points that you would make in each case.



QUESTIONS FOR DISCUSSION

32. **Would you use a verbatim guide to train enumerators in a census? Why?**

33. **What are some ways to describe an imaginary EA boundary?**

34. **What would you include in a post-training test to determine whether the enumerator is able to use an EA map effectively and properly?**

35. If you had to choose between two persons, which one would you choose to be a population census enumerator: (a) one who understands population concepts and enumeration procedures but has difficulty reading a map or (b) one who can read a map well but does not understand concepts and procedures? What steps would you take to improve the person's performance?

Chapter 9. PUBLICATION MAPS AND GRAPHS

1. What are the two types of publication maps?

   a. _____

   b. _____

2. Which of the following is a type of census area identification map?

   a. ☐ EA map
   b. ☐ Map of entire country
   c. ☐ Metropolitan area map
   d. ☐ All of these

3. (Equivalence/conformality) in projections preserve the shape of an area on the map, whereas (equivalence/conformality) in projections preserve the size of an area.

4. A country consists of the mainland plus two small islands at a considerable distance from the mainland. What is the best way to show the map of the country in a published report?

   a. ☐ Show the mainland and two islands at a scale small enough to fit one page
   b. ☐ Show the two islands on inset maps
   c. ☐ Use separate pages
   d. ☐ Show the two islands at large scale and the mainland at small scale

5. When drafting a map for publication, why is it better to draft it at a larger scale than is planned for the published map?

   _____

   _____

6. Lineweight refers to _____

7. What does "generalization" of a boundary mean?

   _____

   _____

8. Which is the preferred style of type to use on publication maps?

   a. ☐ *Script*
   b. ☐ *Courier Italic*
   c. ☐ BLOCK
   d. ☐ *Light Italic*

9. Refer to figure 13b in the manual. What type of index is represented on this map?

   a. ☐ Quadrangle index
   b. ☐ Administrative area index
   c. ☐ Name-finder index
   d. ☐ Photo index

10. Which one of the following items is not included in marginalia?

   a. ☐ Scale
   b. ☐ Source
   c. ☐ Date
   d. ☐ Contour lines

11. In designing maps for publication, one can ignore—

   a. ☐ Fancy border for the map
   b. ☐ Size of the publication page
   c. ☐ Preliminary draft or outline of the publication map
   d. ☐ North arrow and scale

12. When making a dot map, the value of the dots must be selected carefully. What happens if the value of the dot is—

   a. Too low? _____

   _____

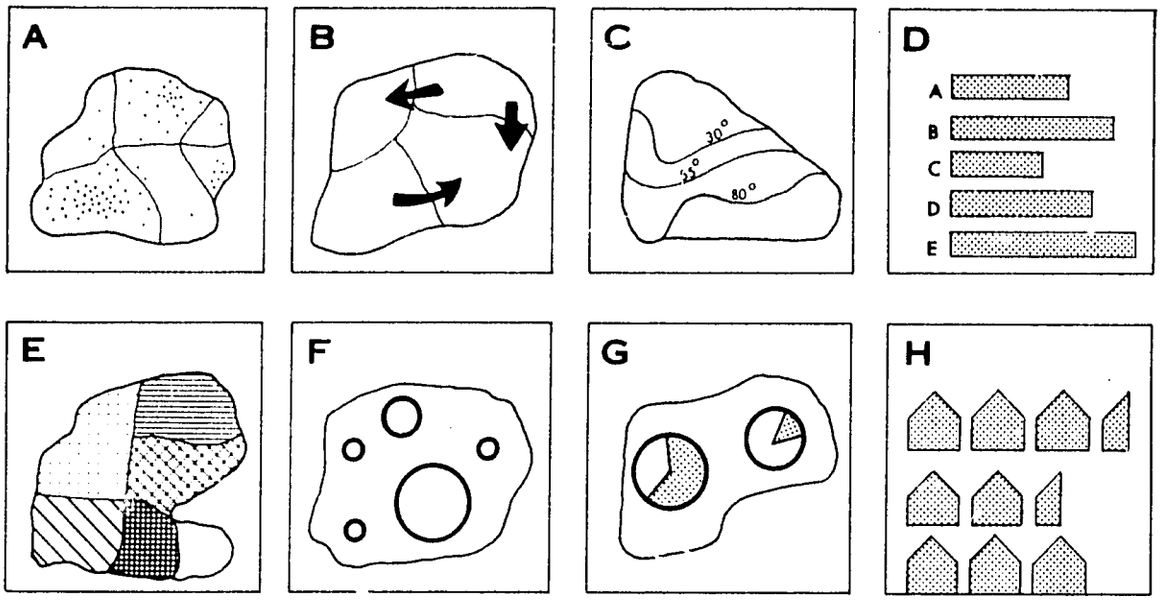
   b. Too high? _____

   _____

13. The ideal number of class intervals on a map is—

   a. ☐ 3 or 4
   b. ☐ 5 or 6
   c. ☐ 7 or 8
   d. ☐ 9 or 10

For questions 14-20, match the maps or charts by placing the appropriate letter in the space provided.



14. _____ Isoline map
15. _____ Dot map
16. _____ Flow map
17. _____ Choropleth map
18. _____ Pictograph
19. _____ Bar graph
20. _____ Divided circle

21. The dots in the illustration represent wheat production. What is wrong with the placement of the dots?

a. _____

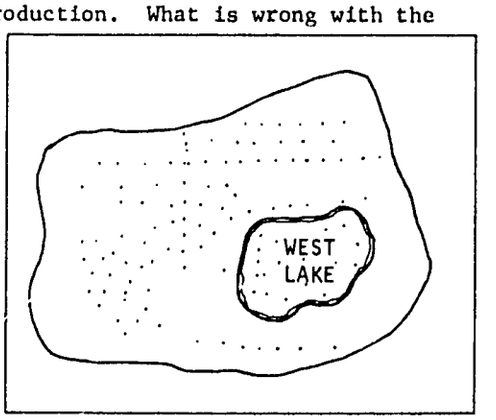
_____

_____

b. _____

_____

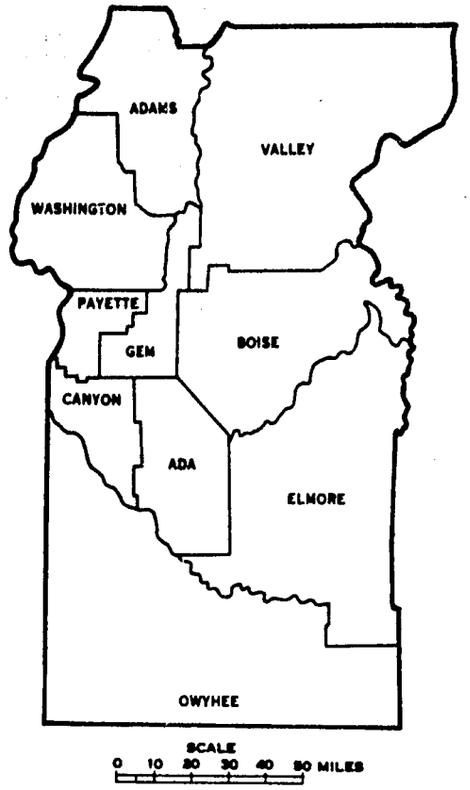
_____

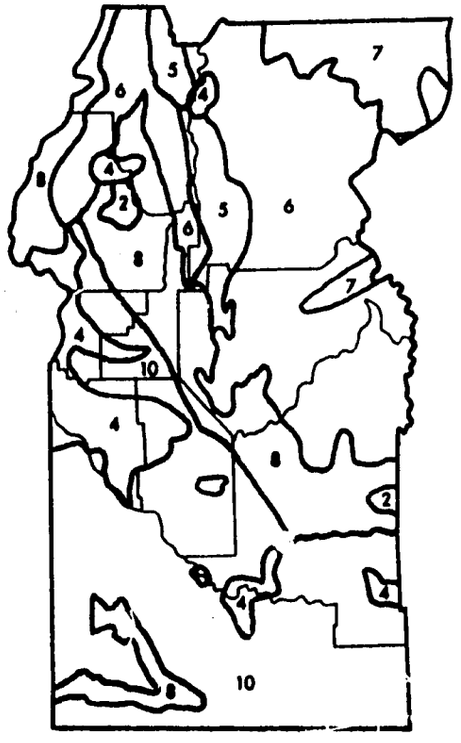


22. If a circle with a radius of 1 cm is used to show a city of 10,000 inhabitants, how large (in cm) is the radius of a circle which represents 50,000 inhabitants?

a. ☐ 5
b. ☐ 50
c. ☐ 2.236
d. ☐ 22.36

23. Below is a map showing the districts within part of a province and a map showing the land use for the same area. Prepare a preliminary dot map showing distribution of agricultural holdings using the map and information on the following page.



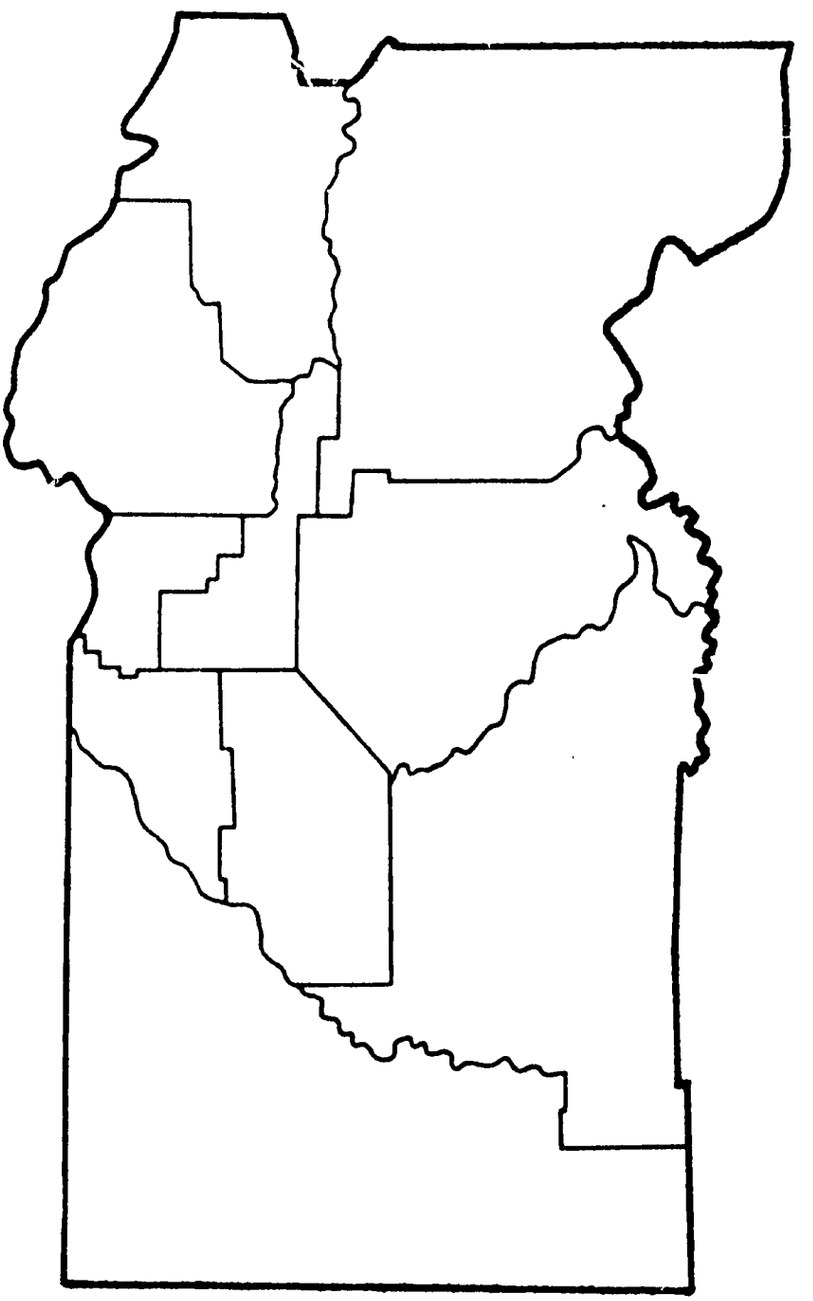


Legend

2. Cropland with grazing land
4. Irrigated land
5. Woodland with some cropland
6. Forest and woodland grazed
7. Forest and woodland mostly ungrazed
8. Semi-arid grassland grazed
10. Desert shrubland grazed

23. *Continued*

Districts	Number of holdings
Adams	141
Valley	97
Boise	70
Gem	492
Washington	503
Payette	663
Canyon	2106
Ada	1292
Elmore	256
Owyhee	553

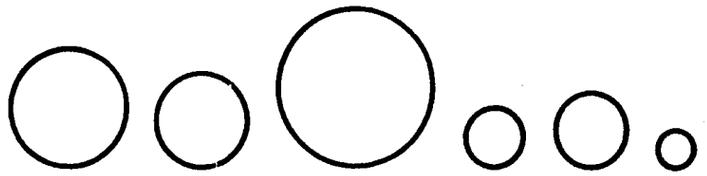


24. _____ is another name for a divided circle.

25. If circles are used on a statistical map showing administrative areas, where should the circles be placed?

_____

26. In the map legend, show how you can arrange these circles to save space?

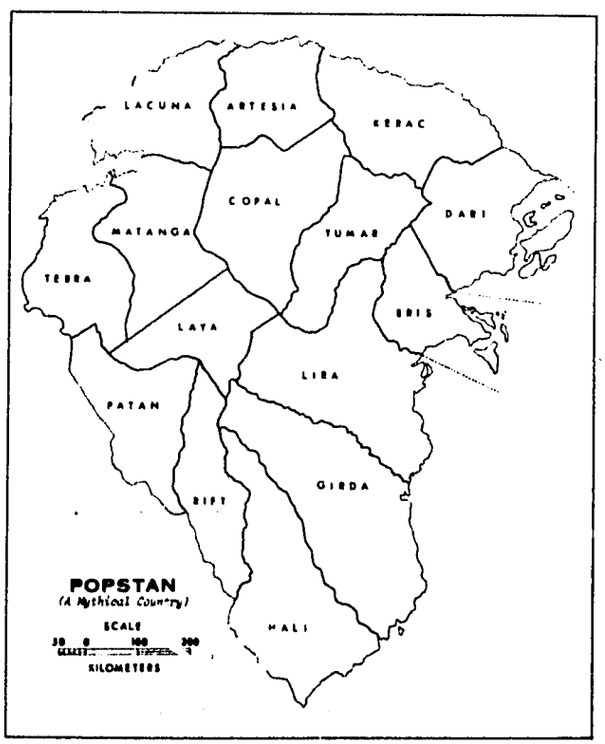


27. For printing purposes, what can you do with the basic colors to produce a variety of shades?

_____

_____

28. On the map below, prepare a rough choropleth map showing population density by province. Select five class intervals and design five patterns that you can sketch on the map in black pencil.



Province	Population density*
Artesia	14.9
Copal	18.3
Dari	36.9
Eris	29.8
Girda	10.1
Hali	9.5
Kerac	22.6
Lacuna	8.2
Laya	8.1
Lira	15.9
Matanga	9.7
Patan	3.3
Rift	7.4
Terra	8.9
Tumar	32.4

*Population per sq. km.

QUESTIONS FOR DISCUSSION

29. What kinds of statistical maps do you recommend for inclusion in census reports?

30. For publication maps of your country, is it necessary that their projections be strictly equivalent or conformal?

31. Base maps are prepared for delineation of EA's. Can these same base maps be used as base maps for publication?

32. How do you determine what class intervals to use for a statistical map or graph?

Chapter 10. DRAFTING OPERATIONS

1. Drafting publication maps requires (more/fewer) drafting personnel than preparing enumeration maps but generally the persons must be (more/less) skillful.

2. Materials and instructions for their use are contained in the map package. Who prepares the map package?

   a. ☐ Local official
   b. ☐ Control clerk
   c. ☐ Compiler
   d. ☐ Draftsman

3. Who should verify the enumeration maps after they are drafte

   a. ☐ Compilers
   b. ☐ Draftsmen
   c. ☐ Map printers
   d. ☐ Field supervisors

4. List four methods for enlarging or reducing maps.

   a. _____
   b. _____
   c. _____
   d. _____

5. Which is the best method, assuming that appropriate equipment is available?

   _____

6. Preliminary tracings of enumeration base maps are best done in pencil on--

   a. ☐ Tracing paper
   b. ☐ Tracing cloth
   c. ☐ Drafting film
   d. ☐ Heavy cardboard

7. Master copies of the enumeration base maps are best done in ink on--

   a. ☐ Tracing paper
   b. ☐ Tracing cloth
   c. ☐ Drafting film
   d. ☐ Heavy cardboard

8. Census publication maps are usually--

   a. ☐ Small scale
   b. ☐ Medium scale
   c. ☐ Large scale

9. The following are tasks for drafting a finished census area identification map. Indicate by number the order in which they are done. Use "1" for the first task.

   _____ Lettering

   _____ Marking latitude and longitude lines

   _____ Drafting shorelines and boundaries

10. Refer to the illustration on the left. What is the person doing?

   a. ☐ Making a photo index map

   b. ☐ Preparing a photo mosaic by feathering

   c. ☐ Making a tracing from an air photo

   d. ☐ Making an overlay

11. What is the purpose of making an uncontrolled photo mosaic?

   _____

   _____

12. What are four advantages of negative scribing over pen and ink drawings to produce census maps?

   a. _____

   b. _____

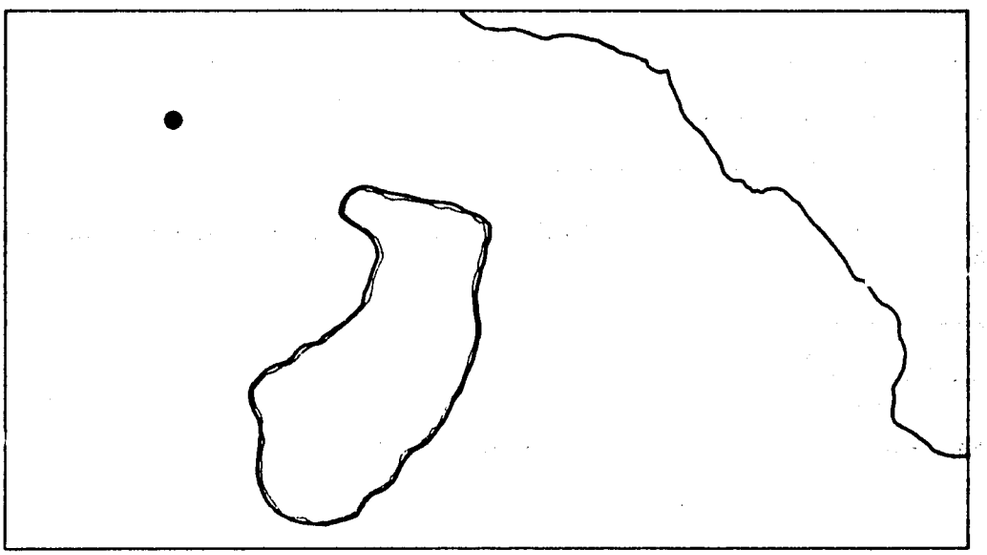
   c. _____

   d. _____

13. Which is the most convenient and useful lettering process for use on census maps?

a. ☐ Hand lettering
b. ☐ Lettering guides
c. ☐ Stick-on lettering

14. Placement of lettering on a map should follow established rules. Print the name of the city, the river, and the lake in the recommended position: Calicut City, Central Lake, and Thaipak River.



15. How could you make your own stick-on lettering?

_____

_____

16. An editor-verifier should make corrections on the--

a. ☐ Original draft map
b. ☐ Master copy of the final map
c. ☐ Copy of the final map
d. ☐ Error report form

17. Open window negatives are used--

a. ☐ Only for black and white maps
b. ☐ Only for color maps
c. ☐ For both black and white and color maps

18. Transparent vellums are often used in drafting. What qualities make vellum a good choice?

a. _____

b. _____

c. _____

d. _____

19. Which has more advantages--tracing paper or tracing cloth? How is it better?

_____

_____

_____

20. Why must a scriber acquire a "feel" for the material and equipment that he will be using?

_____

_____

21. What are some advantages of polyester-based drafting film?

a. _____

b. _____

c. _____

d. _____

22. Which advantage (in question 21) is most important for color separation drawings?

_____

23. List four advantages of India ink.

a. _____

b. _____

c. _____

d. _____

24. List three ways in which errors in ink drawings may be corrected.

a. _____

b. _____

c. _____

For questions 25-28, match the two columns.

25.	_____ Dimensional stability	A.	Resists tearing
26.	_____ Translucent	B.	Degree to which material remains the same size
27.	_____ Opaque	C.	Cuts coating from a film
28.	_____ Peeling or scribing	D.	Diffuses light so that objects can be seen but not distinctly
		E.	Blocks light so that it cannot pass through

29. What material would you use to construct a drafting board?

_____

30. How would you construct a light table?

_____

_____

_____

31. What instrument is generally used to measure area?

a. ☐ Pantograph
b. ☐ T-Square
c. ☐ Planimeter
d. ☐ Compass
e. ☐ Scribing point

32. Why is accurate registration especially important in color separation work?

_____

_____ _____

33. Which type of pen would you select for each of the following tasks?

Task	Contour	Bow	Mechanical free flowing	Railroad
a. For drawing parallel lines.....	☐	☐	☐	☐
b. For drafting enumeration maps.....	☐	☐	☐	☐
c. For free-hand drawing.....	☐	☐	☐	☐
d. For drawing circles.....	☐	☐	☐	☐

For questions 34-36, match the two columns.

34. _____	Drafting compass	A.	Serves as pattern for drawing symbols
35. _____	Spline	B.	Measures area
36. _____	Template	C.	Makes long irregular curves
		D.	Draws circles

37. What is one of the best ways to store loose maps?

a. ☐ Horizontally on open shelves
b. ☐ In folders or envelopes in map cases
c. ☐ Vertically on shelves
d. ☐ Bound in books

38. Map storage areas should have--

a. ☐ Adequate lighting
b. ☐ Cool temperature
c. ☐ Moderate relative humidity
d. ☐ All three requirements

39. List four items which should be included in weekly progress reports.

a. _____
b. _____
c. _____
d. _____

QUESTIONS FOR DISCUSSION

40. How would you select personnel for drafting publication maps?

41. Assume that you have a staff of expert draftsmen with experience in drafting various types of maps. Would you need to prepare a set of specifications for drafting enumeration maps?

42. Can you use enumeration base maps as publication base maps? What modification would you need to make?

43. To keep original maps and drawings requires considerable file space. How could you handle the space problem?

Chapter 11. MAP REPRODUCTION

Before selecting a method of reproduction, what important factors should you consider?

a. _____ e. _____

b. _____ f. _____

c. _____ g. _____

d. _____ h. _____

2. Enumeration maps and publication maps have different requirements. Check the appropriate box for each requirement.

Requirement	Enumeration map	Publication map
a. Small scale	☐	☐
b. Small quantities	☐	☐
c. High-quality paper	☐	☐
d. Small size	☐	☐
e. Non-print process	☐	☐

3. The diazo process produces--

a. ☐ Positives directly

b. ☐ Positives from a negative, reversing each time a copy is made

c. ☐ Negatives only

d. ☐ Positives and negatives

4. Refer to figure 11a in the manual. Which maps can be reproduced by a non-printing process?

a. ☐ All the maps produced by the NSO

b. ☐ Enumeration base maps and publication maps

c. ☐ All the enumeration maps

d. ☐ Individual EA maps only

5. Selection of reproduction equipment depends somewhat on the size of paper it can handle. What is the largest size that diazo-type equipment can handle?

   a. ☐ Approximately 22 cm by 28 cm (8½ inches by 11 inches)
   b. ☐ One meter by one meter
   c. ☐ One meter wide and as long as the roll
   d. ☐ 40 cm by 60 cm (18 inches by 24 inches)

6. What are some advantages and disadvantages of the diazo-type process?

   Advantages: a. _____
   b. _____
   c. _____

   Disadvantages: a. _____
   b. _____

7. (Letterpress/offset) is generally used for printing publication maps.

8. Indicate which reproduction process is recommended to meet the requirement indicated.

Requirement	Diazo	Xerography	Offset
a. Large size maps (more than 60 cm in one direction)	☐	☐	☐
b. Large quantities (more than 100)	☐	☐	☐
c. Multiple color	☐	☐	☐

9. How does the cost of printing a map in four colors compare with the cost of a single-color map (using a one-color press)?

   a. ☐ About the same
   b. ☐ About twice as much
   c. ☐ About 4 times as much
   d. ☐ About 10 times as much

10. Why is it important that the reproduction process for the base maps for EA's will permit easy revision?

_____

11. Indicate whether it is advantageous to purchase or lease the equipment described below.

Equipment that--	Purchase	Lease
a. Is used frequently and does not change rapidly	☐	☐
b. Subject to rapid change	☐	☐
c. Requires extensive maintenance	☐	☐
d. Is expensive and is seldom used	☐	☐

12. One of the most used processes to enlarge or reduce a map is _____

13. In which process are copies limited to the same size as the original (that is, no enlargement or reduction is possible)?

a. ☐ Diazo
b. ☐ Photography
c. ☐ Photocopy
d. ☐ Lithograph

14. Photocopy is generally (quicker/slower) than photography; photography produces (better/poorer) copies than photocopy.

15. The printer will print 200 copies for 10 money units, 400 copies for 16 units, 600 copies for 20 units. This is an example of--

a. ☐ Constant cost per unit
b. ☐ Decreasing cost per unit
c. ☐ Increasing cost per unit

16. The image for offset printing formerly was made on--

a. ☐ Zinc
b. ☐ Aluminum
c. ☐ Paper
d. ☐ Stone

17. Draw an illustration of a line cut.

18. If you were processing negatives, why would you prepare the developer daily?

19. Indicate the kind of reproduction equipment you would select and why?

	Number of copies	Size	Process	Reason
a.	10,000	22 by 36 cm (8½ by 14 inches)		
b.	5	22 by 36 cm (8½ by 14 inches)		
c.	75	1 m by 3 m (40 by 120 inches)		

20. Can corrections be made on a film or must a new map be drawn and a new negative made?

21. How can you "paint out" unnecessary lines and spots on a negative?

22. The list below consists of several cautions that should be observed when developing film. Which of the following is not a caution?

- a. ☐ Keep all parts of the film under the surface of the solution
- b. ☐ Allow a short time for solutions to drip off the film before moving it to the next step
- c. ☐ Mix chemicals in a well-ventilated room
- d. ☐ Open exposed film outside the darkroom
- e. ☐ Be gentle with the solutions while processing

23. What is a "signature" of paper?

24. Fold a blank piece of paper twice (that is, divide it in quarters). This forms an 8-page signature. Without cutting it apart, write the page number in the upper right corner of each of the 8 pages. Also, write the word "Up" on each page. Unfold the paper to show you how the individual images would be placed on the printing equipment.

25. What binding process is generally used for small publications?

_____

26. What binding process is generally used for large publications?

_____

27. Plastic coated paper for EA maps has several advantages. What is not an advantage?

a. ☐ Produces sharper lines
b. ☐ Handles ink better
c. ☐ Withstands rough use
d. ☐ Requires an additional step in the process

28. Unexposed film deteriorates with time. How can the NSO use film that is old?

_____

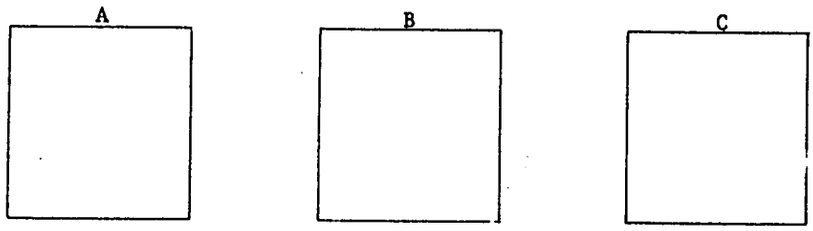
_____

29. A tint screen is a photographic film that produces different shadings. How is the shading achieved?

_____

_____

30. Fill the squares below using only pencil dots to show varying shades of gray (the opposite of tint screens). Make square A the lightest and C the darkest.



31. Insert the correct word: opaque, translucent, or transparent.

a. _____ Diffuses light; cannot see through material clearly

b. _____ Blocks the passage of light completely

c. _____ Light passes through; can see through material distinctly

32. If you used offset printing, would you keep the negative or the press plate?

33. What causes a moiré pattern?

_____

_____

QUESTIONS FOR DISCUSSION

34. What reproduction equipment would you consider leasing instead of purchasing?

35. If you had a large reproduction job to be done quickly and well, what process would you select and why?

36. In your judgment, could you recommend that the cheapest reproduction processes be used for all enumeration maps?

37. What kind of personnel would you recommend for carrying out the various reproduction tasks?

Chapter 12. DEALING WITH PROBLEM AREAS

1. Indicating on the map the location of watering points may be particularly helpful in which type of problem area?

   a. ☐ Desert
   b. ☐ Agricultural area
   c. ☐ Swamp
   d. ☐ Forest

2. If an unpopulated swamp creates a problem for the delineation of EA's, one solution would be to--

   a. ☐ Extend the EA to include the swamp area
   b. ☐ Make the EA smaller than the ideal size using the edge of the swamp as a boundary

3. What special plans would you make for enumerating desert nomads?

   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

4. In a congested area, maps may be cluttered. Which feature would you <u>not</u> remove from the map?

   a. ☐ Hills
   b. ☐ Buildings
   c. ☐ Streets and street names
   d. ☐ Bridges

5. A large sparsely settled barrio has several small settlements which cannot be clearly shown on the barrio map. What is the best solution?

   a. ☐ Enlarge the map of the whole barrio making one large sheet
   b. ☐ Enlarge the map of the barrio, using several sheets
   c. ☐ Use separate maps or map insets at a larger scale for the settlements
   d. ☐ Obtain an air photo of the barrio

6. Some areas have environmental features that create problems. A map with contours or hachures is generally confusing for an enumerator to use. What is an alternative that would alert the enumerator that he is likely to find a high hill or a swamp?

_____

_____

7. Assume you are examining air photos. What characteristics on air photos would indicate sparse settlement and therefore require that more time be allowed for enumerator travel?

a. _____

_____

b. _____

_____

8. Lack of roads or streets on maps or air photos is often an indication of--

a. ☐ Rapidly growing areas
b. ☐ Areas lacking adequate maps
c. ☐ Congested areas
d. ☐ Sparse settlement

9. How would you identify an area of slash/burn agriculture?

_____

10. What is one of the main map problems in a congested area?

_____

11. In the case of a boundary problem between two administrative areas, what can the NSO do?

a. ☐ Ask the two enumerators to agree on a boundary
b. ☐ Ignore the boundary and enumerate the two divisions as one
c. ☐ Establish an official boundary even though opposed by local officials
d. ☐ Establish a boundary for statistical purposes

12. What sources would you use to get mapping information for national parks or military reservations?

QUESTIONS FOR DISCUSSION

13. **It is helpful to have natural and man-made features indicated on enumeration maps. Can a map ever have too much detail?**

14. **What types of areas in your country create major mapping problems?**

15. **In congested areas of large cities, would you recommend air photos or sketch maps?**

Chapter 13. MAPPING FOR SAMPLE SURVEYS

1. Why is control of coverage so important in a survey?

_____

2. Insert "small-scale" or "large-scale" in the blank spaces.

A sample survey uses mostly _____ maps for the enumeration, _____ maps for stratification purposes, and _____ maps for planning assignments.

3. What is the difference between an area sample and a list sample?

In an area sample, _____

_____

In a list sample, _____

_____

4. Which of the following is not true for a continuing survey?

a. ☐ Sample areas must have a unique geo-code
b. ☐ Costs of mapping may be spread over several surveys
c. ☐ Maps must be filed and stored carefully for repeated use
d. ☐ The same detailed maps or air photos can be used without change from survey to survey

5. List four reasons for a geo-coding system in a survey. The code provides unique identification for--

a. _____
b. _____
c. _____
d. _____

6. Generally, a country has some information that can be used in setting up strata. In the absence of numerical data, what source of information would the country use?

_____

_____

7. List four uses of maps and air photos in survey operations.

   a. _____

   b. _____

   c. _____

   d. _____

8. For a sample survey, is it necessary to have an up-to-date map for:

   a. Every administrative division (for example, every 2nd or 3rd order division) of the country?

   ☐ Yes ☐ No

   b. Every PSU that falls in the sample?

   ☐ Yes ☐ No

9. Name four kinds of mapping materials that a country might use in a survey.

   a. _____

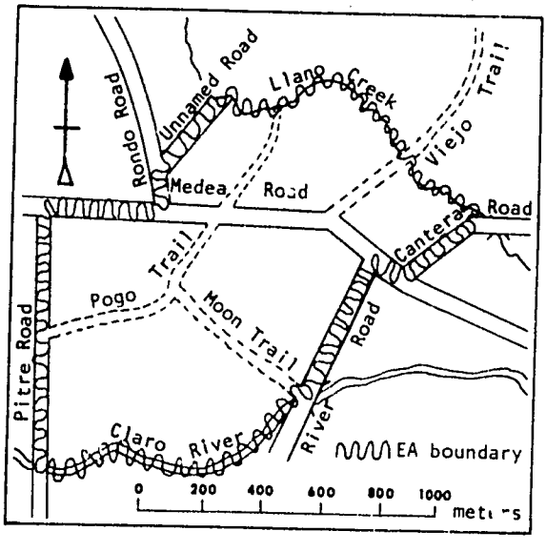
   b. _____

   c. _____

   d. _____

10. Below is an EA which is to be divided into sectors. How many sectors would you have?

_____ sectors



11. How can satellite imagery be used in a survey?

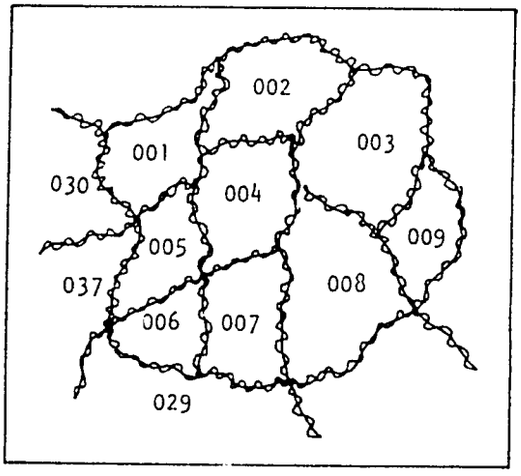
_____

_____

12. You have selected a sample area which is within 5 kilometers of the statistical office but you have no map. Which alternative would you choose: (a) make a sketch map or (b) obtain an air photo? Why?

13. Refer to question 12. If you have many sample sites for which you have no maps, which alternative would you choose and why?

14. Below is an outline of a district with EA boundaries indicated. EA 005 was selected for an intercensal sample survey. However, the map for EA 005 could not be found but all the other EA's in the district were available. How would you proceed?



a. ☐ Eliminate EA 005 from the sample and adjust the weights for other EA's

b. ☐ Select an adjacent EA with similar characteristics

c. ☐ Draw new EA's for the district and select one for the sample

d. ☐ Reconstruct the boundaries by examining EA's 001, 004, 006, and 037

For questions 15 to 18, match the two columns.

15. _____ Stratification

16. _____ Clustering

17. _____ Prelisting

18. _____ Quick count

A. Recording address (or other identification) of each HU, agricultural holding, or establishment in a sample sector before interviewing

B. Enumerating every n^{th} structure

C. Grouping areas with similar characteristics

D. Dividing into subareas and estimating counts of HU's, holdings, etc.

E. Estimating number of HU's, holdings, etc., not in the sample

F. Grouping contiguous HU's, holdings, etc.

19. Why should air photos be taken in the dry season?

20. Which is usually the cheaper method--make enlargements of air photos or re-photograph at a large scale?

    a. ☐ Make enlargements
    b. ☐ Re-photograph at a large scale

21. On photo 6, use a colored pencil (preferably a grease pencil) to stratify cultivated and uncultivated land.

22. A sample segment is shown in photo 7. On photo 6 draw a rectangle around this segment.

23. On photo 7, outline the settlement which would be a sub-stratum of the cultivated area. On photo 7, outline the remaining cultivated area.

24. The enlargement (photo 7) is a combination of which photos on the photo index (photo 6).

    a. ☐ 8-24-64
    b. ☐ 105-22-30
    c. ☐ 211 and 210
    d. ☐ 209 and 210

25. How can current air photos be used to estimate the area of land in crops?

    _____

    _____

26. List five ways to economize in the use of air photos.

    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

QUESTIONS FOR DISCUSSION

27. Why is it important to save census EA maps and tabulations?

28. How would you proceed to take a survey of your country if you did not have adequate maps or data from a census?

29. How can air photos be used in an agricultural survey to measure area under cultivation?

Chapter 14. NEW DEVELOPMENTS

1. What is the difference between satellite imagery and aerial photography?

_____

_____

_____

2. Information collected from Landsat is available in three forms, as follows:

   a. _____

   b. _____

   c. _____

3. How does the area covered by the standard Landsat satellite imagery compare with the area covered by a normal air photo? Satellite imagery covers--

   a. ☐ A slightly smaller area than an air photo
   b. ☐ About the same area as an air photo
   c. ☐ An area 15 times as large as an air photo
   d. ☐ An area 150 times as large as an air photo
   e. ☐ An area over 1,000 times as large as an air photo

4. Satellites have some distinctive advantages for mapping. List four such advantages.

   a. _____

   b. _____

   c. _____

   d. _____

5. Unfortunately, at this time, satellite imagery has some disadvantages for census use. List five disadvantages.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

6. How may Landsat satellite imagery for an individual country be obtained?

   a. ☐ Only by launching a satellite and processing data received from it
   b. ☐ Only by establishing receiving stations
   c. ☐ By purchasing reproductions from countries with receiving stations

7. List five features which ordinarily cannot be recognized on Landsat images.

   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

8. List three specific uses of satellite imagery in a census or survey.

   a. _____
   b. _____
   c. _____

9. Which element is not significant for interpretation of satellite imagery?

   a. ☐ Size
   b. ☐ Shape
   c. ☐ Tone
   d. ☐ Texture
   e. ☐ Shadow

10. For census purposes, which MSS bands are considered to be the most useful?

11. On color composite satellite images that include infrared bands, in what color does healthy growing vegetation appear?

   a. ☐ Green
   b. ☐ Blue
   c. ☐ Yellow
   d. ☐ Red

12. Statistical agencies use automated cartography mostly to produce

   a. ☐ Base maps
   b. ☐ Topographic maps
   c. ☐ Statistical maps
   d. ☐ Sketch maps

13. Refer to figure 14d of the mapping manual. Fill in the blanks below from the information on the image.

Date image was recorded _____

Latitude of image center _____

Longitude of image center _____

Spectral band that was sensed _____

14. Would you recommend using automated cartography to produce EA base maps if you are just starting a mapping program and have no maps? Give the reason for your answer.

☐ Yes
☐ No
☐ Probably

Reason: _____

15. Describe data file and area boundary file.

Data file: _____

_____

Area boundary file: _____

_____

16. How can a boundary be described in digital form, in terms of--

a. Location? _____

_____

b. Nature of boundary (kind of feature being followed, if any)? _____

_____

c. Areas being identified? _____

_____

17. List four graphic output devices which may be used for automated cartography.

a. _____

b. _____

c. _____

d. _____

18. List two advantages of interactive automated systems.

a. _____

b. _____

19. List two kinds of statistical maps that can be readily produced by automation.

    a. _____

    b. _____

20. Automated cartography is (faster/slower) and (more accurate/less accurate) than manual map construction.

21. Automated cartography is more commonly used for (statistical maps/base maps) than for (statistical maps/base maps).

22. A system for identifying each point on a map where a street or other feature intersects another or changes direction is called a--

    _____

23. Name two elements that are necessary for a workable GBF system.

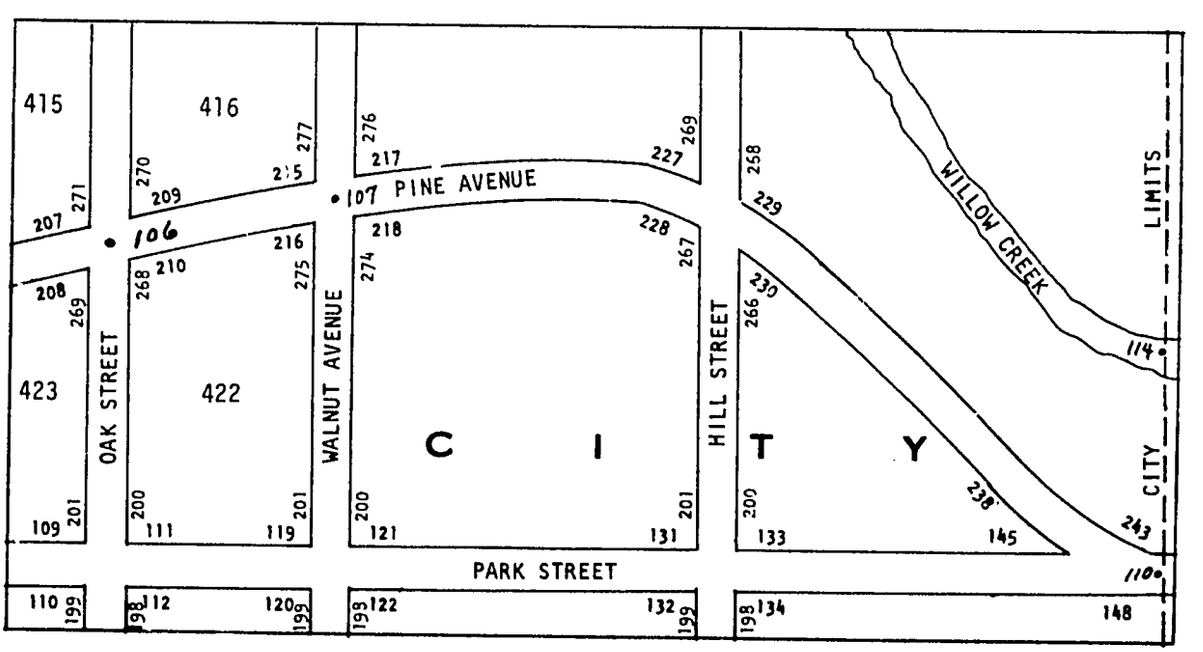
    a. _____

    b. _____

24. How many numbers (coordinate values) are needed to locate a line segment?

    _____

25. Refer to the illustration below. Number the nodes, starting with 106; number the blocks, starting with 415. Assume the entire area is in tract 39. The city code is 025, and outside the city is 999. On the first and last lines of the worksheet are the entries for two GBF records. In a similar manner, fill the remaining eight lines



25. *Continued*

"From" node	"To" node	Street		Left side					Right side				
		Name	Type	Address range		Block No.	Tract No.	Area No.	Address range		Block No.	Tract No.	Area No.
				Low	High				Low	High			
106	107	PINE	AVENUE	209	215	416	39	025	210	216	422	39	025
110	114	CITY LIMIT	BOUND-ARY	—	—	418	39	025	—	—	—	39	999

QUESTIONS FOR DISCUSSION

26. How can a GBF be used to coordinate data from various sources?

27. Under what conditions would Landsat images be useful in preparing base maps for your country?

28. Satellite imagery has repetitive coverage; that is, images can be taken of the same area again and again. How can this help planning agencies?

29. What facilities does your country have that could be used for automated cartography? (Every country has some.)

30. How can GBF eliminate duplication of data collection activities?

Chapter 15. STATISTICAL AREAS

1. Social and economic characteristics are the criteria that are used to define (administrative areas/statistical areas).

2. Small statistical areas are usually (more homogeneous/more heterogeneous) than large statistical areas.

3. Why is it desirable that major regions retain their boundaries for a series of censuses? Check the principal reason.

   a. ☐ Simplifies the work of the geography staff
   b. ☐ Satisfies precise criteria when boundaries are retained
   c. ☐ Permits analysis of trends
   d. ☐ Eliminates need to discuss definition with data users

For questions 4-7, match the two columns.

4. _____	Metropolitan area	A. Small statistical area within a city and its surrounding area; has some uniformity of characteristics
5. _____	Urbanized area	B. Central city plus surrounding administrative areas that are integrated with the central city
6. _____	Region	C. Subdivision of 1st or 2nd order divisions
		D. Group of related 1st order divisions
7. _____	Census tract	E. Rural agricultural village
		F. Central city plus surrounding built-up area

8. What are three essential characteristics that are frequently used to define "urban" places?

   a. _____
   b. _____
   c. _____

9. The area of influence of a metropolitan center consists of groups of 2nd order divisions of a country. It is called--

   a. ☐ Urbanized area
   b. ☐ Metropolitan region
   c. ☐ Metropolitan area
   d. ☐ Subregion

10. Metropolitan subareas are usually--

    a. ☐ Smaller than a census tract
    b. ☐ Larger than a census tract
    c. ☐ About the same size as a census tract
    d. ☐ About the size of a metropolitan region

11. Describe the difference between the homogeneity principle and the functional integration principle.

    Homogeneity principle: _____

    _____

    Functional integration principle: _____

    _____

12. Although both principles are used to some extent when defining statistical areas, give an example of an area that is based primarily on homogeneity and one that is based primarily on functional integration.

    Homogeneity principle: _____

    _____

    Functional integration principle: _____

    _____

13. Assume that you wish to publish statistics for small areas such as city blocks, many of which have fewer than 20 housing units. Describe two problems that you may have with areas this small.

    a. _____

    _____

    b. _____

    _____

Some factors are very important in setting up statistical areas, while others are less important. For each of the following, explain its importance.

14. **Population size of area:** _____

    _____

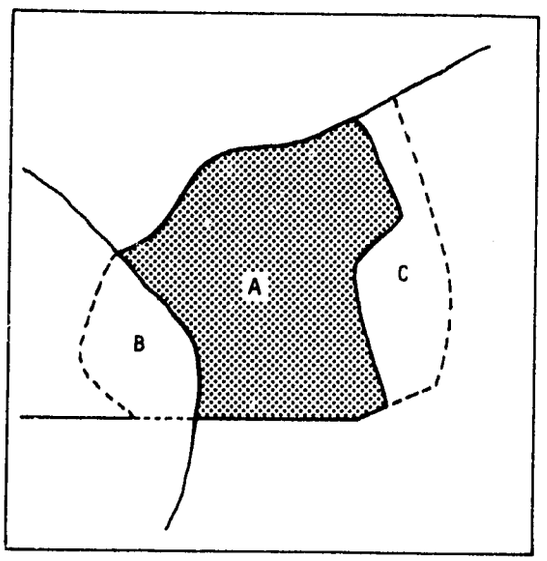
15. **Land area size:** _____

    _____

16. **Shape of area:** _____

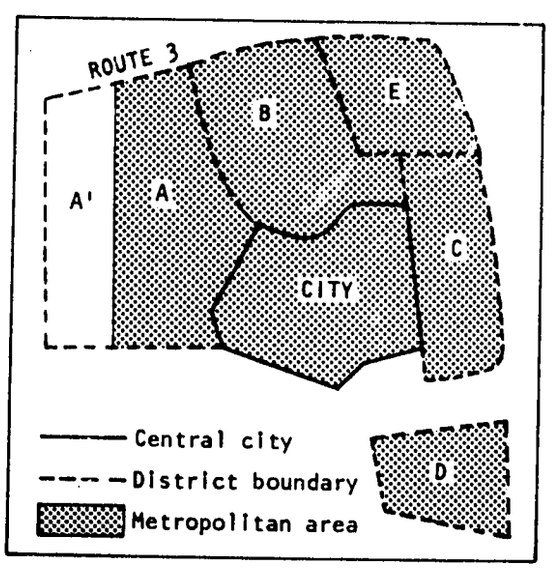
    _____

17. Below is an illustration of a city whose boundaries changed between 1970 and 1980. (Parts B and C were added.) The 1980 census for the city shows a substantial increase in population. The analyst discussed the change in population from 1970 to 1980 for the area as defined in 1980. What is missing in this analysis?



18. For the city in question 17, how can you tabulate the data to get a true picture of change from 1970 to 1980?

19. Below is an illustration of a metropolitan area. What is wrong with the delineation (using the definition of central city plus adjoining administrative divisions)?



a.

b.

20. Some new statistical areas are being set up for a growing city. The local officials feel they should delineate the areas. What part should the NSO play in setting the boundaries?

    a. _____

    b. _____

21. When should boundaries of a small statistical area be changed? Boundaries should be changed--

    a. ☐ When users determine that the existing area does not meet their needs

    b. ☐ For each census

    c. ☐ When the population of the area increases

    d. ☐ When the population of the area decreases

QUESTIONS FOR DISCUSSION

22. What types of statistical areas has your country established and for what purpose?

23. Could you set up statistical areas for a country that has not taken a census?

24. What are some ways to promote the use of data for statistical areas?

25. What is the value of having data for both urbanized areas (city and surrounding built-up area) and metropolitan areas (city and adjoining administrative divisions)?

TABLES OF LENGTH AND AREA

System	Length				Area			
METRIC SYSTEM	1,000 millimeters	= 1.0	meter		100 sq. meters	= 1.0	are	
	100 centimeters	= 1.0	meter		100 ares	= 1.0	hectare	
	10 decimeters	= 1.0	meter		100 hectares	= 1.0	sq. kilometer	
	1,000 meters	= 1.0	kilometer					
INCH-POUND SYSTEM	12 inches	= 1.0	foot		144 sq. inches	= 1.0	sq. foot	
	3 feet	= 1.0	yard		9 sq. feet	= 1.0	sq. yard	
	5,280 feet	= 1.0	mile		43,560 sq. feet	= 1.0	acre	
	1,760 yards	= 1.0	mile		1 sq. mile	= 640	acres	
CONVERSION FROM METRIC	1 millimeter	= 0.04	inches		1 sq. centimeter	= 0.15	sq. inches	
	1 centimeter	= 0.39	inches		1 sq. meter	= 1.20	sq. yards	
	1 meter	= 39.37	inches		1 sq. kilometer	= 0.39	sq. miles	
	1 kilometer	= 0.62	miles		1 hectare	= 2.47	acres	
CONVERSION TO METRIC	1 inch	= 2.54	centimeters		1 sq. inch	= 6.45	sq. centimeters	
	1 foot	= 30.48	centimeters		1 sq. yard	= 0.84	sq. meters	
	1 yard	= 0.91	meter		1 sq. mile	= 2.59	sq. kilometers	
	1 mile	= 1.61	kilometers		1 acre	= 0.40	hectare	

ANSWER KEY

Answers are provided for only a sample of the questions; in some cases, reference is made to the section in the manual where the answer can be found.

Chapter 1.

1. *a* 2. *c* 3. *d* 4. *a* 7. *B* 12. *C* 17. *b* 18. *a* 19. *See section 3.25*

Chapter 2.

5. *a* 6. *c* 10. *b* 14. *b* 17. *a* 22. *D*

Chapter 3.

2. *d* 4. *c* 7. *c* 8. *300 miles or 480 km* 9. *See section 6.44* 14. *b* 16. *A*

17. *a, d, e* 20. *J7* 23. *b.* 33. *a*

Chapter 4.

2. *a* 5. *See sections 3.1 and 3.2* 8. $\frac{1}{30,000}$ 9. *d* 13. *c* 21. *L* 23. *c*

28. *D* 35. *From Q1 to N19* 46. *Fenced pasture land* 53. *a*

Chapter 5.

4. *b* 5. *e* 7. *See section 5.2* 10. *See section 5.12* 14. *A*

Chapter 6.

1. *See section 1.1* 5. *c* 10. *3* 12. *b, c, f* 16. *See section 4.2*

17b. *Enlarge* 21. *a* 25. *c*

Chapter 7.

5. *See section 5.1* 9. *S-023* 10. *C* 14. *a* 19. *Yes* 22. *No* 33. *D* 35. *B*

36. *d*

Chapter 8.

1. *4* 4. *350 m* 7d. *PRE* 8. *See section 4.1* 15. *See section 11.21*

21. *Railroad* 24a. *About 150 m*

Chapter 9.

2. *d* 4. *See section 2.24* 10. *d* 13. *b* 14. *C* 22. *c* 24. *Pie chart*

26. *See section 3.47*

Chapter 10.

4. *See section 4.2* 5. *Photography* 6. *a* 9. *2, 1, 3* 10. *b* 25. *B* 28. *C*

31. *c* 33d. *Bow* 36. *A*

Chapter 11.

3. *a* 5. *c* 7. *Offset* 9. *c* 10. *See section 2.6* 11a. *Lease* 15. *b* 22. *d*

27. *d*

Chapter 12.

2. *See section 4.11* 4. *c* 11. *d*

Chapter 13.

3. *See section 2.2* 4. *d* 8a. *No* 8b. *Yes* 14. *d* 18. *D*

Chapter 14.

3. *e* 6. *c* 8. *See section 2.6* 9. *e* 10. *5 and 7* 11. *d* 22. *GFD*

23. *See section 4.2*

Chapter 15.

2. *More homogeneous* 3. *c* 9. *b* 12. *See sections 4.11 and 4.12* 21. *a*

☆U.S. GOVERNMENT PRINTING OFFICE: 1978 0--264-449