CALIFORNIA STATE BOARD OF REGISTRATION
FOR PROFESSIONAL ENGINEERS

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C

1979
LAND SURVEYOR
PRINCIPLES AND PRACTICE

1. This examination is given in two four-hour periods on the same day. The subject matter relates to the principles and practice of Land Surveying. Part C is the first of two parts.

2. In the workbook, you are to work all of the problems in this booklet.

3. You may withdraw from scoring any part of your work by isolating that part and writing VOID across it. Delineate the voided part clearly.

4. Enter your identification number in the upper right-hand corner on each page where space is provided.

5. Read the instructions on the workbook cover page.

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7. You may keep this set of examination questions.

Department of Consumer Affairs
State Board of Registration for Professional Engineers
California
1979

Problem C1 Wt. 12.5 (Required)

Problem C1 includes the following plates identified as I and II. A complete solution requires that all necessary procedures be explained in your workbook.

(2.5) (a) Describe how the original North Quarter Corner of Section 4 was set.

(2.5) (b) Describe how the original Northwest and Northeast corners were set.

(2.5) (c) With the data given on Plate II, describe how you would set a monument at the North Quarter Corner of Section 4.

(2.5) (d) Using the data given on Plate II, determine the length of the West line of Lot 4 of Section 4 within one foot.

(2.5) (e) Using the data given on Plate II, determine the length of the East line of Lot 1 of Section 4 within one foot.

PLATE I IS A COPY OF A PORTION OF A TOWNSHIP PLAT.

PLATE II IS THE RESULT OF A SURVEY SHOWING THE ACTUAL RELATIVE POSITIONS OF THE ORIGINAL CORNERS AND CLOSING CORNERS.

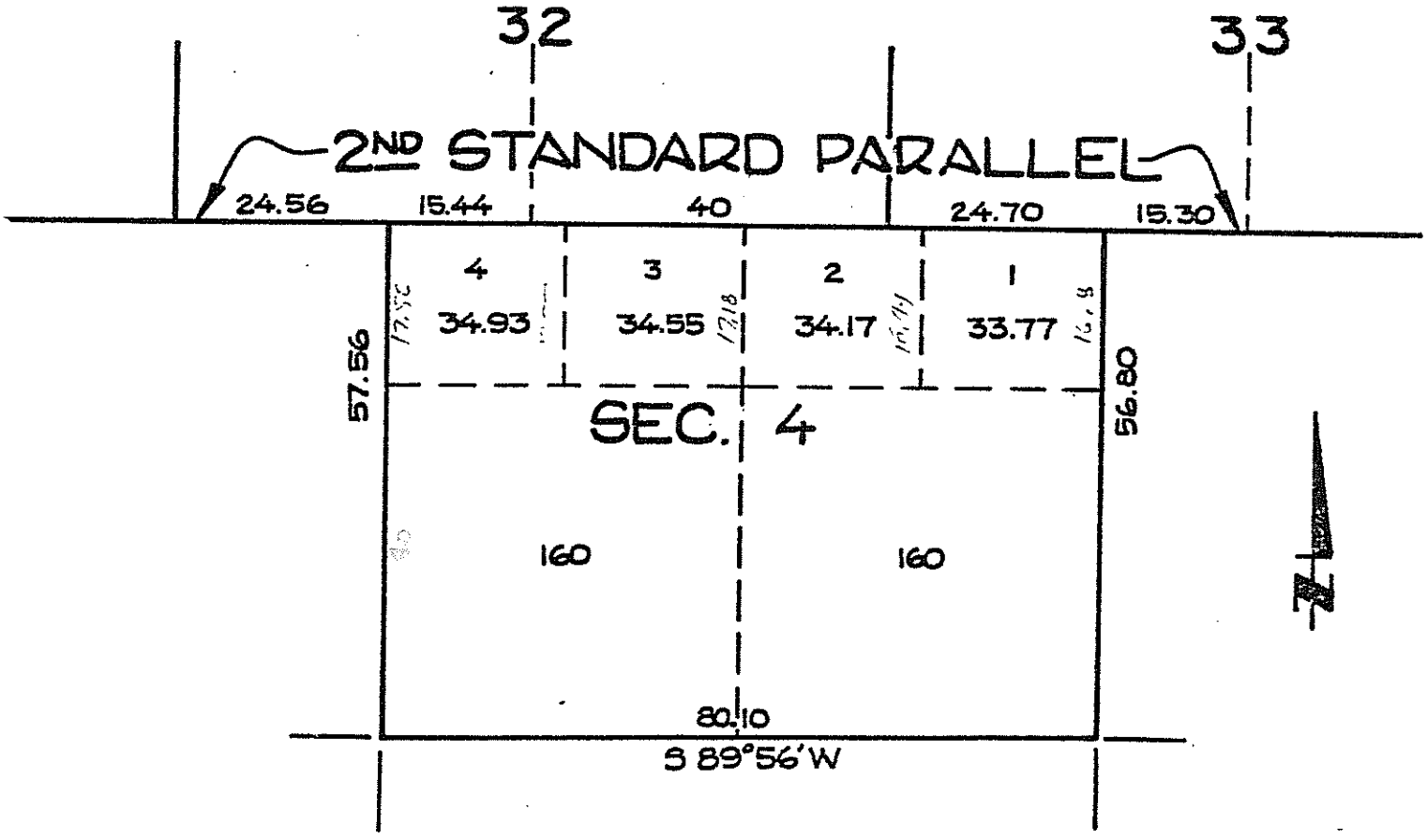
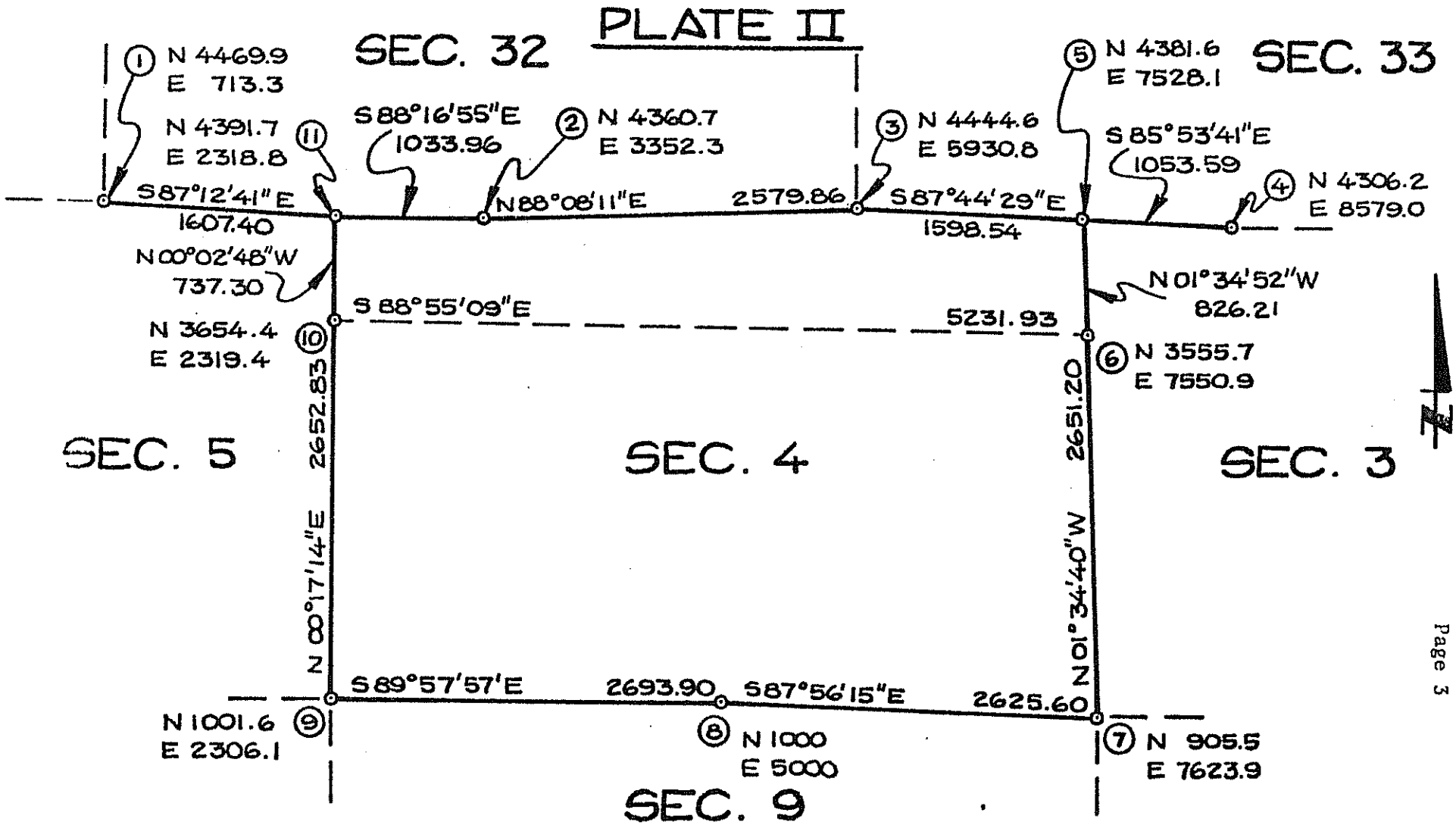


PLATE I

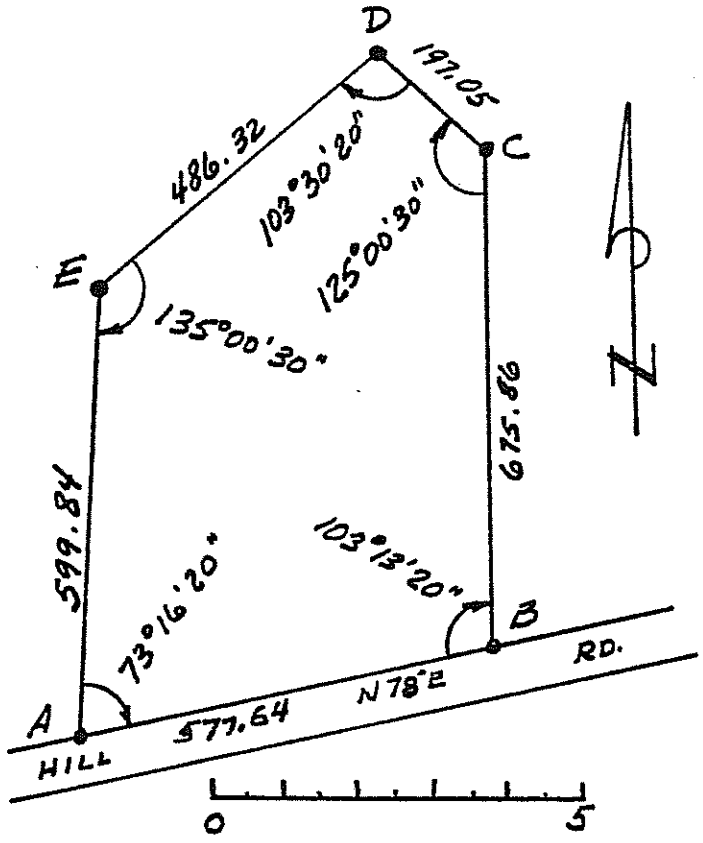
PLATE II



THE CORNERS NUMBERED ① THRU ④ WERE SET ON THE ORIGINAL SURVEY OF THE 2ND STANDARD PARALLEL IN 1865 BY JONES. THE CORNERS NUMBERED ⑤ THRU ⑪ WERE SET IN 1868 BY ENGALLS. ALL CORNERS ARE OF UNQUESTIONED INTEGRITY.

NOTE: COORDINATES, BEARINGS, AND DISTANCES ARE GIVEN TO FACILITATE COMPUTATIONS.

The calculations for this survey of industrial property in Sacramento have just been completed and checked. What further action will you take before releasing the survey to the client?



All monuments found.

FIG. C2

	STATION	HORIZONTAL DISTANCE	BEARING DEG. °	MIN. '	SEC. "		COORDINATES N S			COORDINATES E W			
1	A						10	000	000	10	000	000	1
2		577 64	N	78	-	- E							2
3	B						10	120	098	10	565	017	3
4		675 86	N	1	13	20 E							4
5	C						10	795	804	10	579	433	5
6		197 05	N	53	46	10 W							6
7	D						10	912	268	10	420	484	7
8		486 32	S	49	44	10 W							8
9	E						10	597	955	10	049	384	9
10		599 84	S	4	44	40 W							10
11	A						10	000	170	9	999	771	11
12		-	N	78	01	00 E							12
13													13
14		Closure 0.285				S	53° 20'	04"	E	1/8889			14
15													15
16													16

Problem C3 Weight 10.0 (Required)

Indicate in your workbook whether each of the following statements is True or False. Explain your answer. Provide a reference to an applicable section of California law to support your answer if one is appropriate. If the statement is False, indicate what makes it False. Provide a correct statement of what the principle should be.

(a) A county surveyor may refuse to file a Record of Survey map until the licensed surveyor who performed the survey upgrades the monumentation of the survey to conform to the county's minimum standards for subdivision monumentation.

(b) Any person who prepares and/or issues a legal description for the conveyancing of real property is in violation of the Land Surveyors Act if he is not authorized to practice land surveying.

(c) A parcel of land through which passes a fee-owned railway right-of-way may now (1979) be considered as two separate parcels for subdivision purposes.

(d) A licensed land surveyor cannot be denied permission to enter upon private lands to gain access to monuments controlling the location of the boundaries of another person's land.

(e) A written description of land using the California Coordinate System as its primary controlling reference is an acceptable description, and may be used to transfer title of land from one person to another and, when recorded, imparts constructive notice of said transaction.

(f) The planning commission of a city or county may require the dedication of land or the payment of fees in lieu thereof, or both, for park or "greenbelt" areas as a condition of approval of a parcel map for a major shopping center complex. (by County Ordinance)

(g) When a licensed surveyor obtains the testimony of a landowner concerning the location of a lost or obliterated corner he may secure such evidence under oath, but must record such oath on his Record of Survey map.

(h) A licensed land surveyor who offers his surveying services as a "professional engineer in land surveying" violates the title protection afforded registered engineers by the Business and Professions Code.

(i) A parcel map, when compiled from record, must show at least two lines of the boundary as being monumented, but no survey need be made of those lines.

(j) Lands presently subdivided by a valid subdivision map cannot be resubdivided into a different number and/or configuration of lots without first filing a final map reverting such lands to a single parcel and then filing a final or parcel map showing the new division of the land.

Problem C4 Weight 10.0 (Required)

The accompanying map of Tract No. 1742 is to be used for this problem. It is to be assumed that the map is as filed for record with the county. Certificates, etc. not relevant to the problem are omitted.

This is a summary of transactions affecting title to lands in and adjacent to Tract 1742:

Year	Area	Action
1868	T1S, R2E	Plat of T.1S., R.2E., MXM approved
1894	NW 1/4 S. 17	Patent to Jenkins
1912	NW 1/4 S. 17	Grant deed: Jenkins to Wilbur
1935	NW 1/4 S. 17	Grant deed: Wilbur to Smith
1938	N'ly 30 Ft. NW 1/4	Road dedication: Smith to County
1943	Por. NW 1/4	Grant deed: Smith to Brown
1945	Por. NW 1/4	Grant deed: Smith to Craig
1948	Por. NW 1/4	Tract No. 1742 approved and filed
1949	Lot 1, Tr. 1742	Craig to Jensen
1949	Lot 3, Tr. 1742	Craig to Wilson
1950	Lot 2, Tr. 1742	Craig to Nelson
1950-52	All remaining lots of Tr. 1742	Craig to various people

All lots within Tract 1742 were conveyed by descriptions reading "...Lot n of Tract No. 1742 as shown by map filed in Book 24, Pg. 71, of maps in the office of the Recorder of said county."

The portion of Section 17 from which Tract No. 1742 was created was conveyed to Craig in 1945 by a deed which described the land as follows:

"All that portion of the NW 1/4 Section 17, T.1S., R. 2E, MDM, in the County of _____, California, described as follows: Beginning at the Northwest corner of the lands of Brown as said lands were conveyed by deed recorded in Book 1259, Page 368 of Official Records of said county, said northwest corner being a point on the west line of said Section 17, 470,000 feet south of the northwest corner thereof; THENCE S60°00'E along the northerly line of said lands of Brown 1039.23 fee; THENCE North, parallel with the west line of said Section, 959.62 feet to County Highway No. 18 (60 feet wide); THENCE west along said highway to the west line of said Section; THENCE South along said west line to the point of beginning."

Remove the page containing the map of Tract 1742 from the examination booklet and attach it to your workbook. The following questions will require the use of this map.

(a) Indicate on the map of Tract 1742 the following:

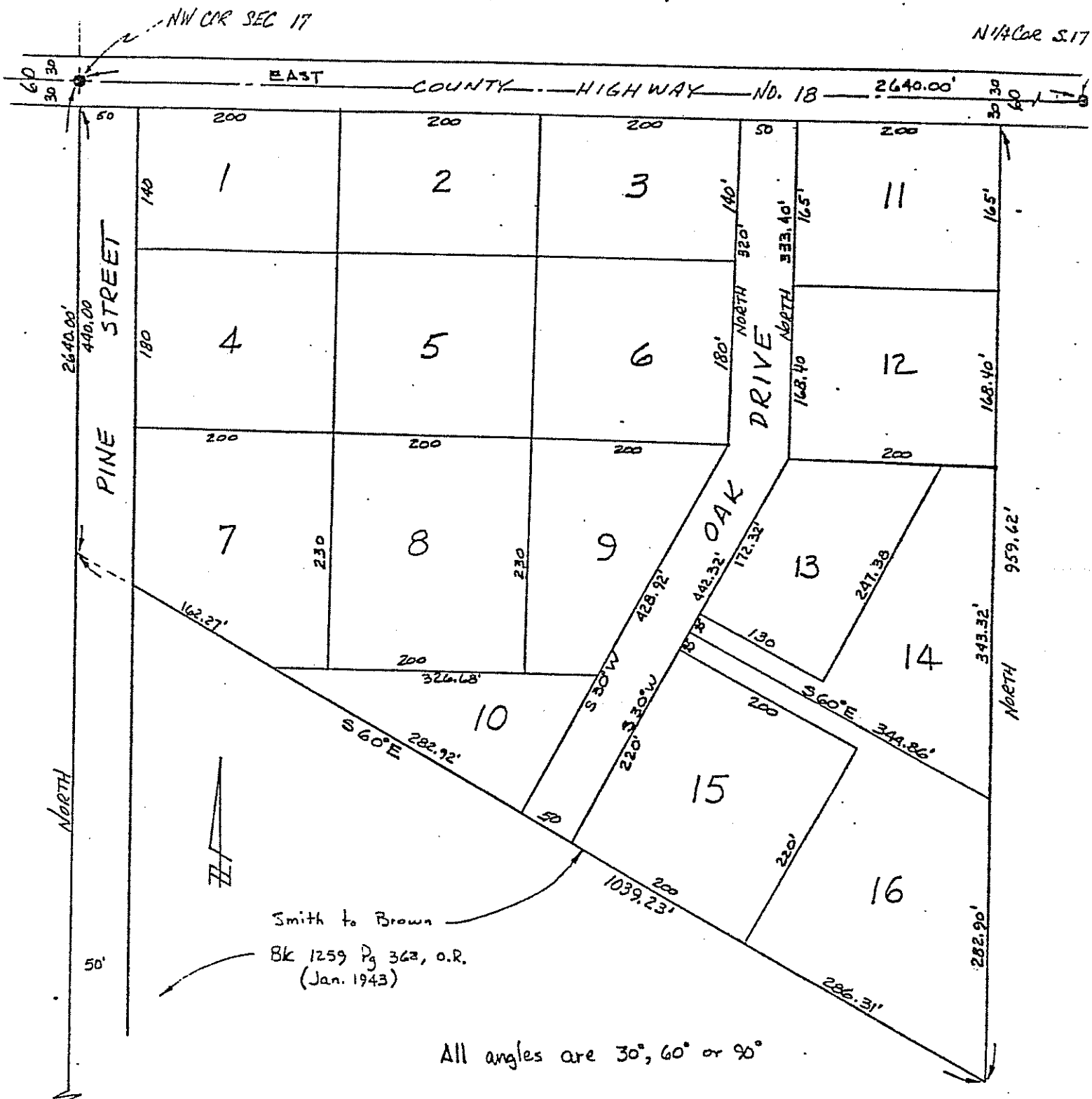
1. The extent of the fee conveyed to Craig
2. The extent of the fee conveyed to Jensen
3. The extent of the fee conveyed to purchaser of Lot 7
4. The extent of the fee conveyed to purchaser of Lot 9

(b) State or show on the map of the tract how the extent of the fee to Lots 1, 7 and 9 would change, if at all, upon vacation of Pine Street and Oak Drive by the county. State the applicable principle of surveying and/or law which adequately supports your answer.

PROBLEM C4 (contd)

TRACT NO. 1742

(M.B. 24/71)



All angles are 30°, 60° or 90°

Note: All lot corners are marked by 1"diam. x 24" long I.P. tagged LS 2000, 12" below surface.

Pine Street and Oak Drive are hereby dedicated to the public for street purposes.

Problem C4 (Continued)

(c) What rights, if any, do the owners of lots fronting on Pine Street and Oak Drive have to the access of their lots upon vacation of these streets?

(d) What is the effect of the missing dimensions in Lots 1, 5, 7 and 9? Although they can be easily calculated, can it be presumed that they were intended to have been so used? Explain.

(e) Explain or show how the extent of the fee conveyed to Craig would have differed if the last three courses in the description given above had been written to read: "...THENCE North, parallel with the West line of Section 17, 538.68 feet to the North line of said Section; THENCE West along said North line 900 feet to the northwest corner of said Section; THENCE South along the West line of said Section 470 feet to the point of beginning."

Problem C5 Weight 5.0 (Required)

If the "point of beginning" in a description of a parcel of land cannot be located with certainty, is the description invalid? Explain.

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L S D

1979
LAND SURVEYOR
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1. This examination is given in two four-hour periods on the same day. The subject matter relates to the principles and practice of Land Surveying. Part D is the second of two parts.

2. In the workbook, you are to work Problems D1 through D5 plus a selection for a total of 50 points.

3. You may withdraw from scoring any part of your work by isolating that part and writing VOID across it. Delineate the voided part clearly.

4. Enter your identification number in the upper right-hand corner on each page where space is provided.

5. Read the instructions on the workbook cover page.

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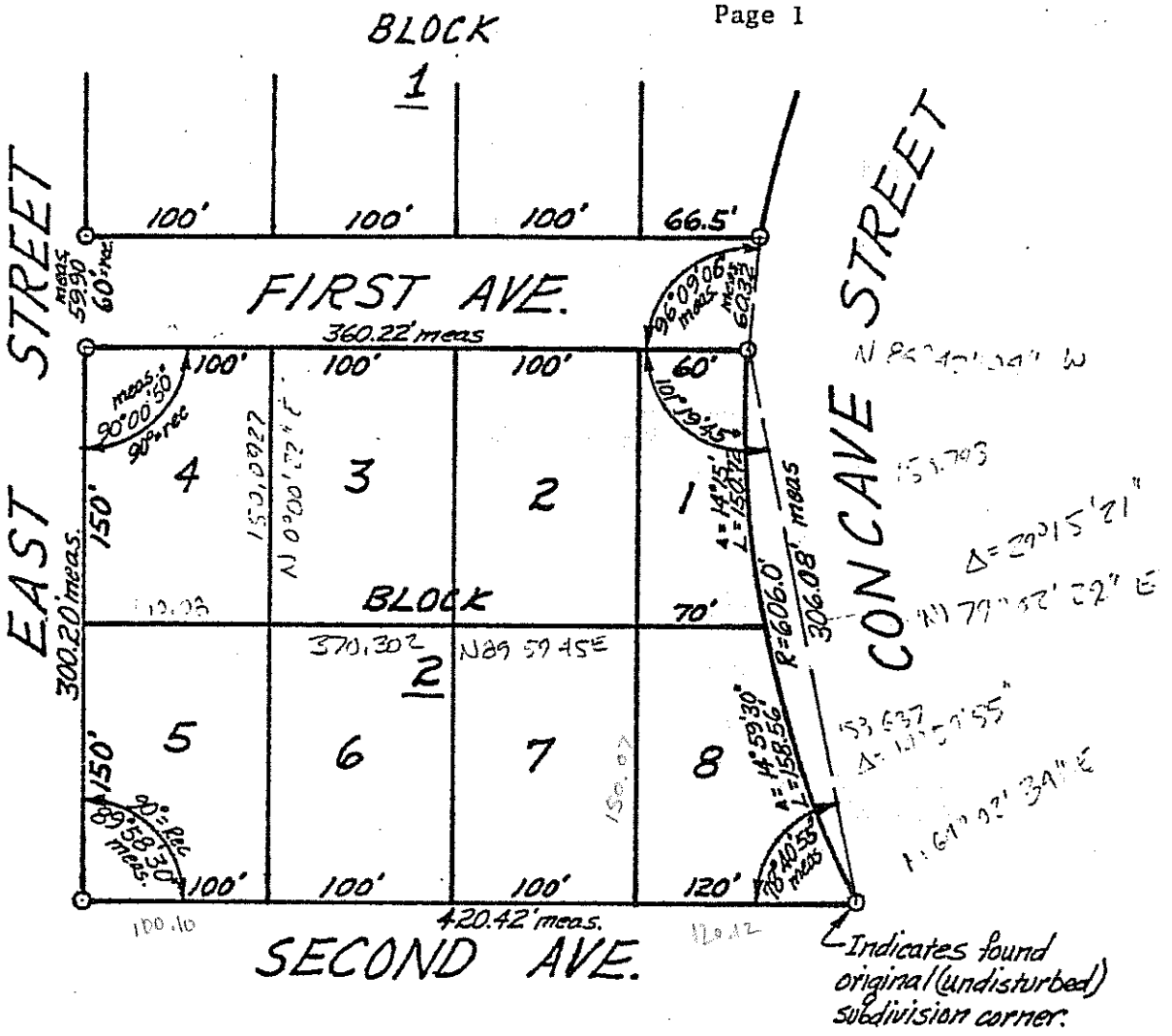

FIG. 01

Above, is Block 2 and a portion of Block 1 of Pratt's Subdivision showing record dimensions as well as measured angles and distances between found subdivision monuments.

A. What are the surveyed lineal dimensions of Lot 4? Briefly explain the principle that lead to your answer.

B. What are the surveyed lineal dimensions of Lot 1? include Δ, L and R for the curve and briefly explain the principle that lead to your answer.

Problem D2 Weight 10.0 (Required)

COUNTY OF SAN BERNARDINO

SECTION 15, TOWNSHIP 6 SOUTH, RANGE 12 EAST S.B.M.

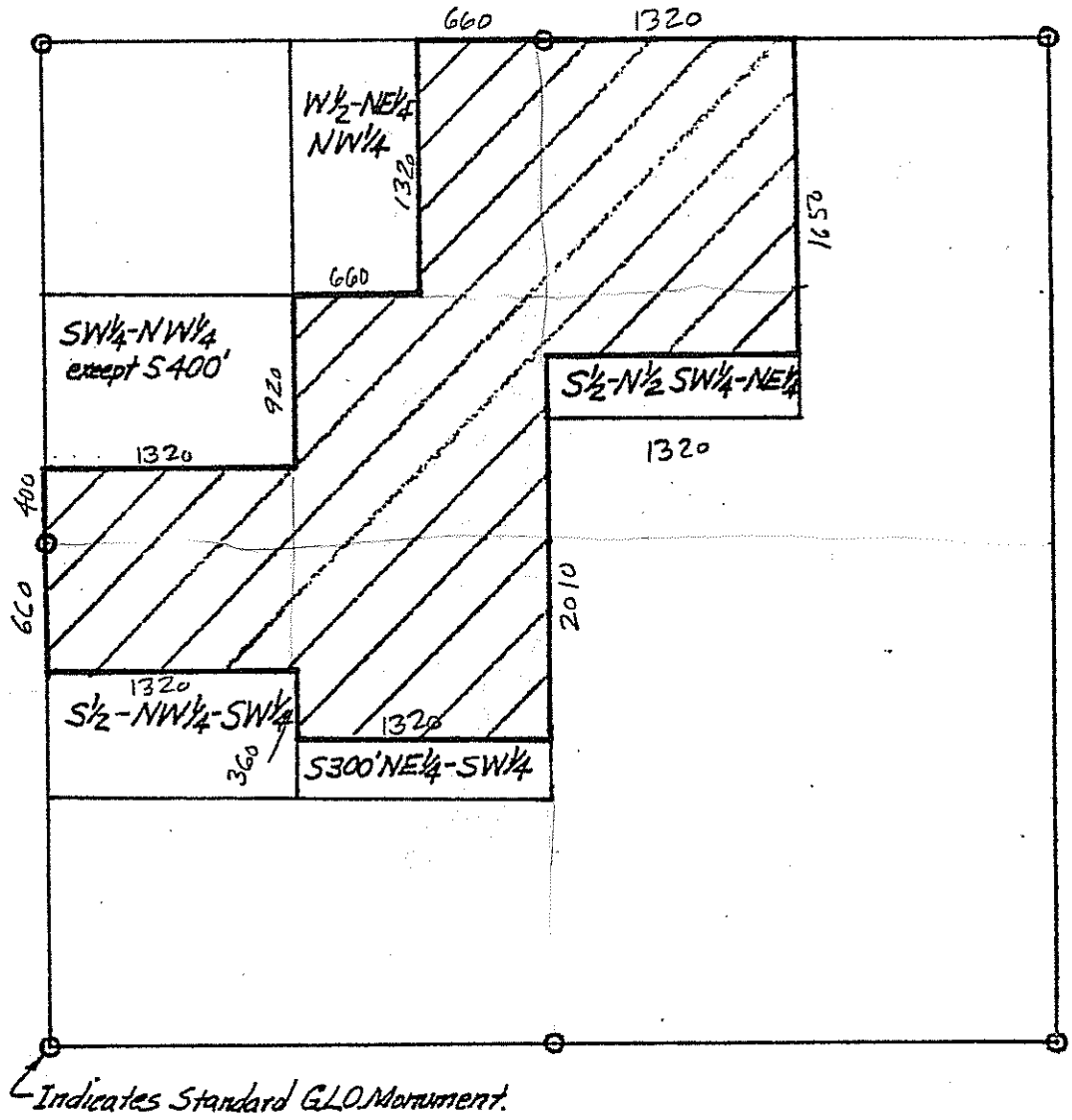

FIG. D2

Indicates Standard G.L.O. Monument.

A. Write a metes and bounds description for the crosshatched portion of Section 15 shown above. Assume a standard 1 mile, square section.

B. What is the approximate area (in acres) of the crosshatched portion?

Problem D3 Weight 5.0 (Required)

Describe the land surveyor's obligation to each of the following:

(a) his client.
(b) adjacent land owners.
(c) future owners of the lands.
(d) County Surveyor.
(e) general public.

Problem D4 Weight 7.5 (Required)

When one interprets a description which does not close mathematically, or finds a description in which there are conflicting calls, which elements are to be held superior to others? What are the guiding principles that should be followed to resolve the ambiguities created by poor mathematics or conflicting calls?

Problem D5 Weight 7.5 (Required)

The sketch on the following page represents a traverse which was run to establish control for a boundary survey. The angles were measured with a 1" direction theodolite, and the distances with EDM equipment. The bearings of lines A-B and E-F were determined by direct solar observation, and are as stated on the sketch.

REQUIRED:

(a) With respect to the angular data, determine and state whether, or not, you find it to be acceptable. Give specific reasons for your determination.

(b) If you believe the (angular) data to be acceptable, show the adjustment(s) you would apply, and the adjusted angles and bearings. If you believe the data to be unacceptable, state what particular action you would take to make it acceptable.

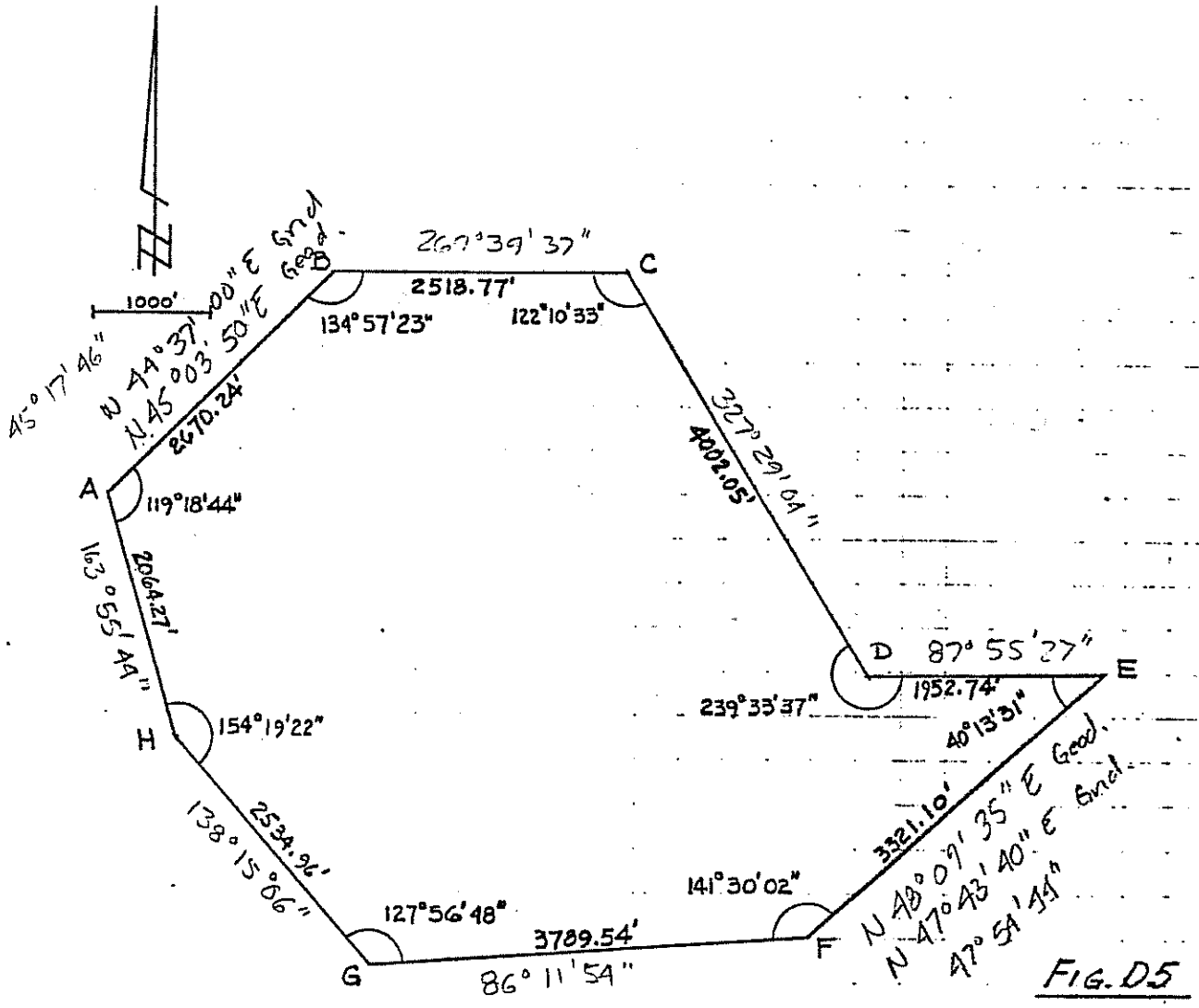

FIG. D5

A: Lat. 34° 45' 08" N
Long. 117° 03' 50" W

A: N 40,000.00
E 20,000.00

E: Lat. 34° 44' 52" N
Long. 117° 02' 10" W

Mean elevation = 1200' MSL
Calif. Coord. Zone 6

Bearing of line AB from solar observation = N 45° 03' 50" E
Bearing of line EF from solar observation = S 48° 09' 35" W

Problem D6 Weight 5.0 (Optional)

In 1937, the following deeds were written to divide the southeast quarter of Section 9 of a certain township:

> "The west eighty acres of the Southeast quarter of Section 9, T5S, R1E, SBM."

and

> "The east eighty acres of the Southeast quarter of Section 9, T5S, R1E, SBM."

Discuss the problems which might arise when attempting to survey these parcels. What would be your method to locate the corners of these parcels?

How could these deeds be written to obviate these problems and to avoid misunderstanding of intent?

Problem D7 Weight 5.0 (Optional)

Reproduce the sketch shown below in your workbook.

REQUIRED:

(a) Dimension all four sides of the shaded area shown in the figure as per the United States Government Survey.

(b) Write a legal description sufficient to convey the shaded portion of the section.

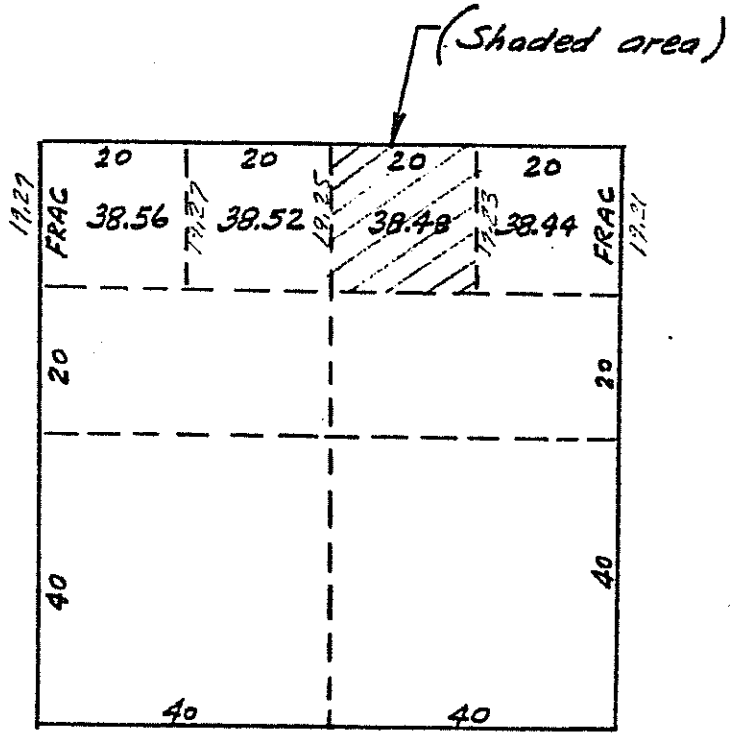

FIG. D7

SEC. 1, T9N, R1E, SBM
Per Govt. Survey 1876

Problem D8 Weight 5.0 (Optional)

The Cul-de-sac shown is ready for curb stakes.

How would you place the stakes to build the curb?

How should the stakes be marked?

To what accuracy should the stakes be marked?

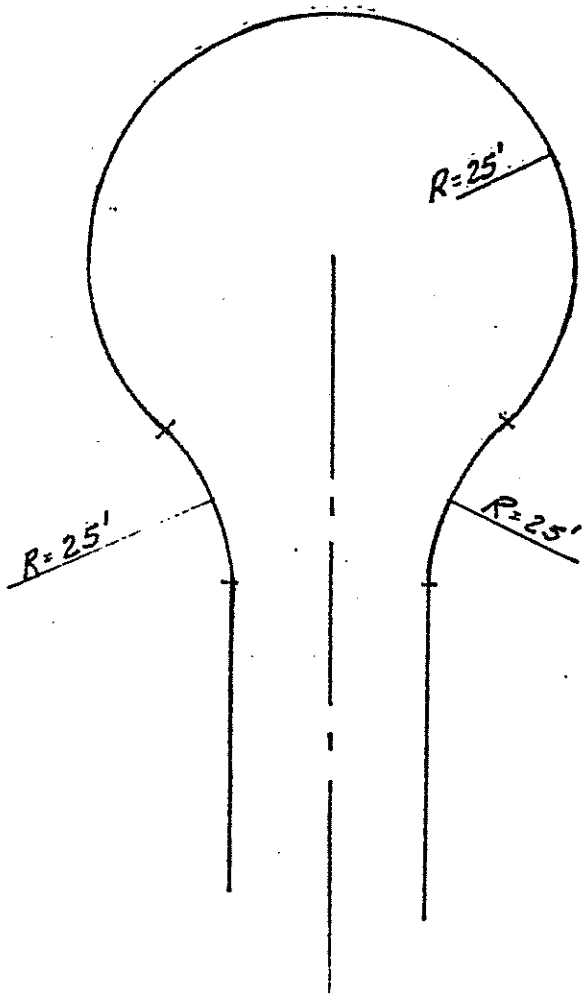

FIG. D8

Problem D9 Weight 10.0 (Optional)

Criteria:

6" focal length camera
Manuscript compiled at 1:600
Kelsh type plotter
Mapping Area: Rectangular 16,000 Ft. x 1,200 ft.
Level Terrain
Fully field controlled

REQUIRED:

(a) Photo scale
(b) Flight altitude over mean terrain
(c) Number of flight lines
(d) Minimum number of models
(e) Minimum number of wing points
(f) Optimum distance between horizontal control points
(g) Vertical accuracy to be expected for contours
(h) Horizontal accuracy to be expected for planimetric features