

# Saskatchewan Land Surveyors Association

## Practical Surveying

April, 2017

Time Allowed: 3 hours

### Instructions

- You may use any self contained calculator or computer that is battery operated.
- Partial marks may be awarded for incorrect answers if the solution process can be followed and is correct.
- Intermediate calculations are not necessary, but sketches and/or a brief description of geometric construction will show that you understand the problem and solution process.
- For traverses, a sketch showing the angular and linear input is all that is required. Showing coordinates is not required unless they form part of the answer.
- If the information appears vague, incomplete or incorrect and you make an assumption, state that assumption in your work.

## Question 1

You have been hired to subdivide SW 29-22-29-3 (Northerly 150m of 1/4). You are at a stage in the subdivision process where you must complete the field survey and post the subdivision.

Using information provided in Appendix A (listed below, i to iii), answer the following questions.

*i. Field Note Sketch (1 page)*

*ii. Coordinate list derived from RTK GPS and total station measurements (local coordinates). Assume check measurements have been made*

*iii. Township Plat (Twp 22, Rge.29 W3M)*

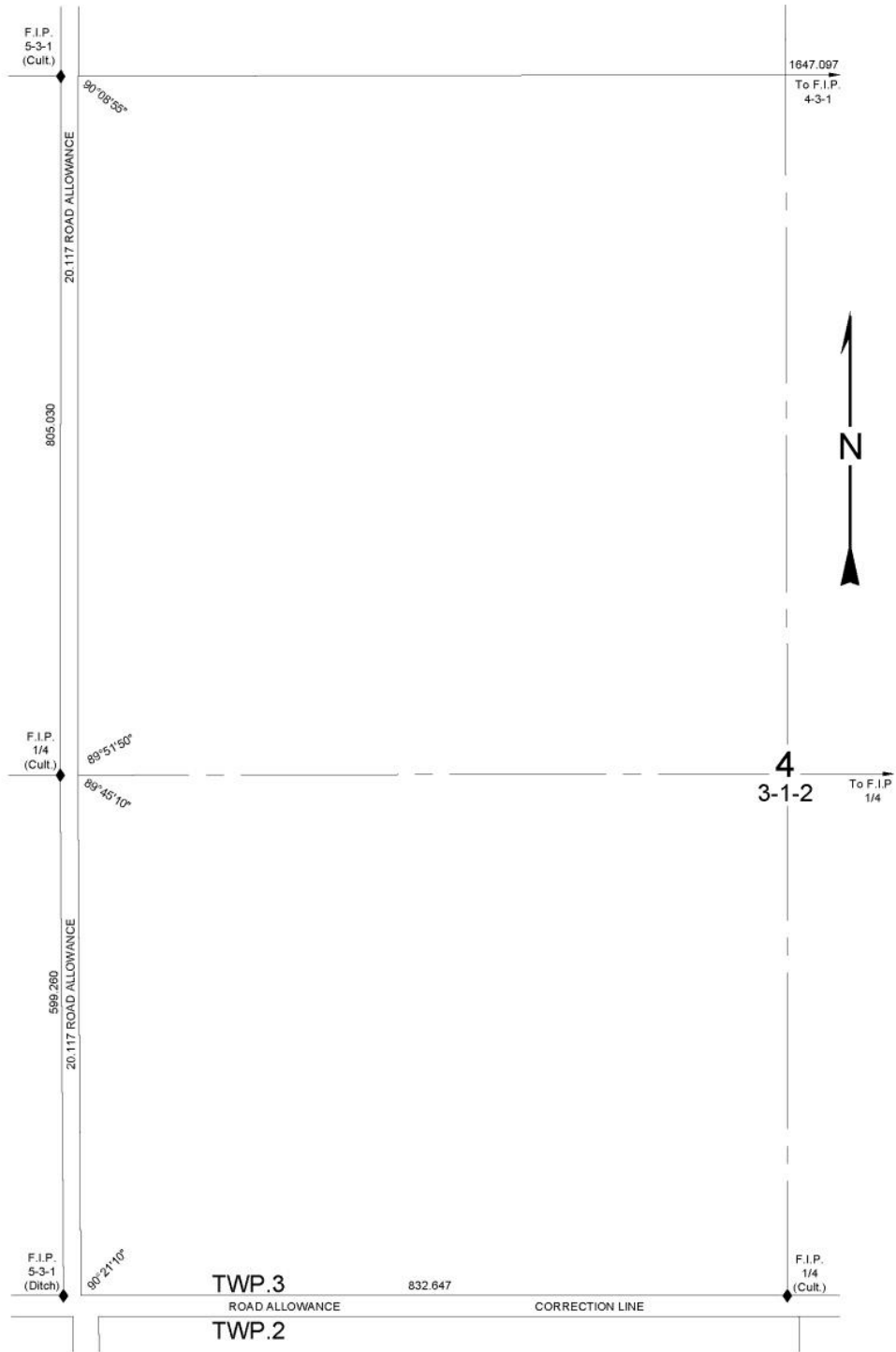
- |          |   |
|----------|---|
| 10 marks | 1. Establish and dimension (angles and distances) the section and subdivision boundaries on a separate sketch, including found monuments and placed posts and marker posts. |
| 5 marks  | 2. What notations would need to be on the final plan at N ¼ 29 and NE 29?   |
| 3 marks  | 3. Based on Bulletin 38, describe the shape and dimensions of the monument you expect to find at Wit. 8.80 S.   |
| 2 marks  | 4. How would the Wit 8.80 S monument differ, if at all, if it was erected in 1875 in prairie?   |

## Question 2

The sketch below shows evidence found and measurements taken to define the boundaries of Section 4, Township.3, Range. 1 W2M. The township plat is also included in Appendix B.

- 5 marks            1. Sketch the LSD boundaries (SW  $\frac{1}{4}$  4) and dimensions on the sketch
- 5 marks            2. Add the posts that are required to be placed in the event that the survey you are conducting (subdivision) requires the establishment of all of the LSD boundaries of SW 4-3-1-2.
- 5 marks            3. If one of the monuments required in question 2(2) cannot be placed due to the location of a power pole, what do you do?
- 15 marks           4. During your field work you find a monument at center of section 4. It is 2.25 metres from the position you calculate. For each scenario provide:
- your opinion, is the monument a governing monument?
  - provide a detailed argument as to your opinion,
  - describe what research you would do in order to substantiate your opinion:
- i.        The monument is an unmarked 'brass-cap'. ISC corner and plan search yields no plan records of this monument being erected. It is in prairie with no fence lines or crop lines.
  - ii.       The monument is an old pattern IP. There is a mess of barbed wire that appears to be no more than 20 years old, but there are a couple of spilt cedar fence posts laying in the area.
  - iii.      The monument is a standard iron post with a Pxxx of a well-established survey firm but there are no plans showing the establishment.

# Sketch for Question 2

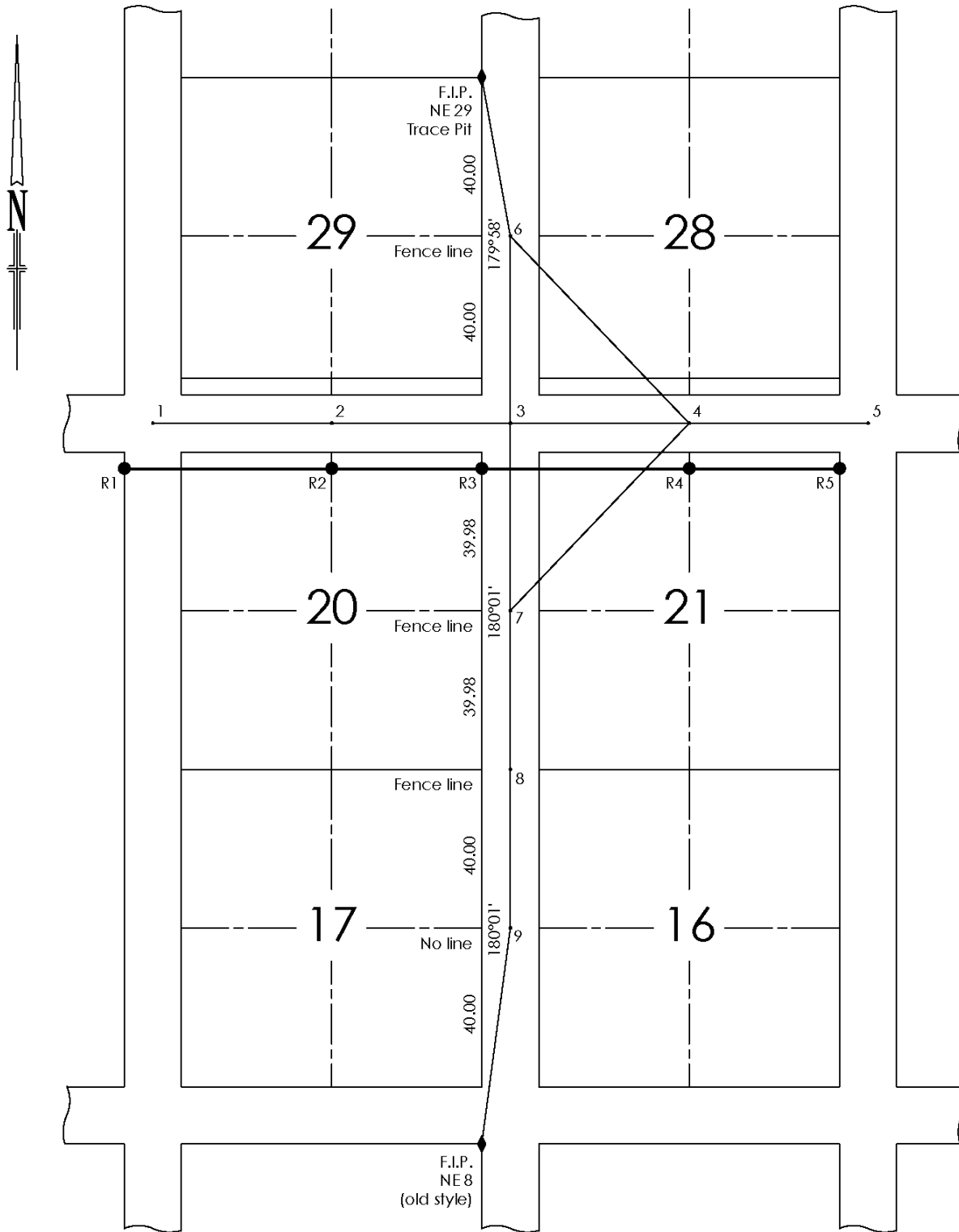


### Question 3

- 10 marks      You have found an I.P. at the NE 8 and NE 29. Using the field notes on the following page, compute the information (angle and distance from the traverse nails) to look for the NE corner of section 17 and 20 from the township platt information (shown on sketch). Use the bearings from the township platt information when establishing the corners.
- 10 marks      From your search, an I.P. hole is found at the NE corner of section 17. The angle, back sighting on nail 7 and setup on nail 8, to the I.P. hole is  $270^{\circ}18'25''$ . **The distance is 8.975 metres. Using this information** compute the position of the NE corner of section 20. and establish R3 (angle and distance from the traverse nail). The survey line (R1-R5) is parallel and offset 12.0 metres south of the traverse line (1-5).
- 10 marks      Compute the information (distances and angles) for the east boundaries of 17, 20 and 29. Compute the widening and angle from the survey line to the east boundary of section 20 at R3.

You can show the information on the sketch on page 8

Question 3 cont'd - Field Sketch for Question 3



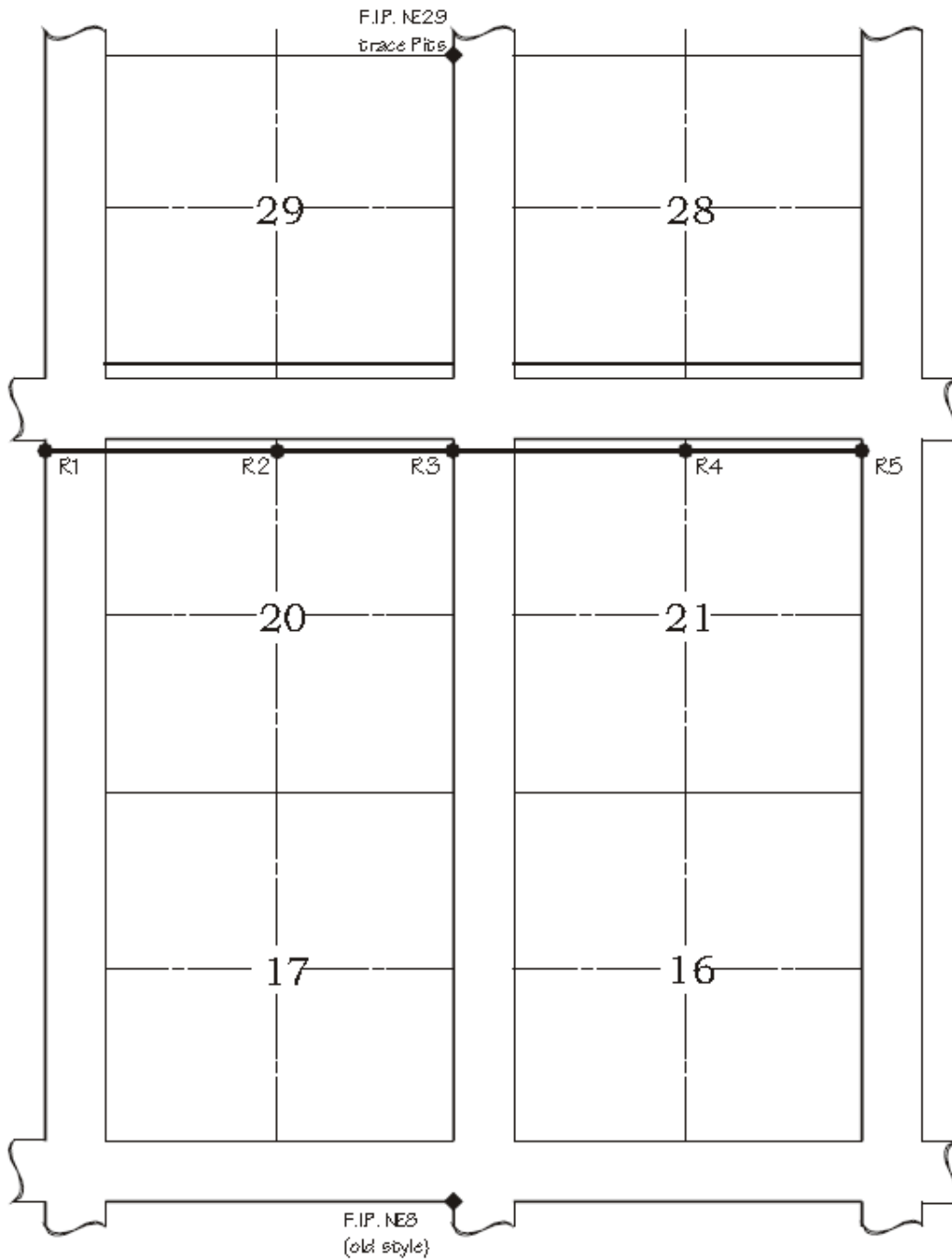
### Question 3 cont'd - Field Notes for Question 3

21-Jul-94 Joe Surveyor  
 Job: 1006-05 Bob Rodman  
 Inst. Nikon NTM-A10  
 Conditions: Cloudy and calm (can see for miles)

Station	HCR	Distance (horizontal)
at Nail 2 - BS at Nail 5 - 0°00'		
Nail 5	0°00'00"	2439.53
Nail 4	0°00'00"	1627.19
Nail 3	0°00'00"	811.52
at Nail 6 - BS at Nail 3 - 0°00'		
Nail 3	0°00'00"	817.64
Nail 4	315°05'20"	1155.28
F.I.P NE29	179°30'00"	804.33
at Nail 7 - BS at Nail 3 - 0°00'		
Nail 3	0°00'00"	810.86
Nail 4	45°09'50"	1150.29
Nail 9	180°	1604.62
Nail 8	180°	804.15
at Nail 9 - BS at Nail 7 - 0°00'		
F.I.P NE8	180°43'20"	830.89

**Note:**  
 The angles are from  
 the BS nail for each tie

Question 3 cont'd - Answer Sketch for Question 3





## Question 4

In question 3, the survey nails were placed on line with the fence lines.

5 marks

How close are the fence lines to the final reestablishment (approx. north/south distance)?

There is some redundant information in the survey information (two triangles).

5 marks

Compute the linear accuracy in each case and briefly discuss if it is acceptable.

5 marks

Because of the differences in the measurements, what error could you expect in the computed angle at R3?

5 marks

If the hole you dug at the NE of section 20 looking for evidence was 1.5 metres across, does the new position, calculated after you found the I.P. hole at the NE of section 17, still fall within this hole?

## Appendix A Question 1

Point	Northing	Easting	Elevation Description
1	11631.472	10030.778	624.248 F.I.P. 30-22-29
2	10824.932	10014.859	619.241 F.I.P. 1/4
3	10000.000	10000.000	620.486 F.I.P. 19-22-29
4	10000.000	10797.455	622.751 F.I.P. 1/4
5	9997.228	11591.573	622.117 F.I.P.20-22-29
6	11791.682	11635.681	618.521 F.I.P. WIT 8.8
7	13230.240	11648.889	621.153 F.I.P. 32-22-29

# Appendix A Question 1

