Faculty of Engineering

Prince of Songkla University

Midterm Examination 1st Semester 2004

Subject : 220-361 Surveying II

Room : A401

Date : July 31st , 2004

Time: 9:00 – 12:00

Instructions

1) There are 5 problems. (100 points)

2) Attempt all problems.

3) Books and Notes are not allowed.

4) Students may use an electronic calculator

5) Students may bring in a dictionary.

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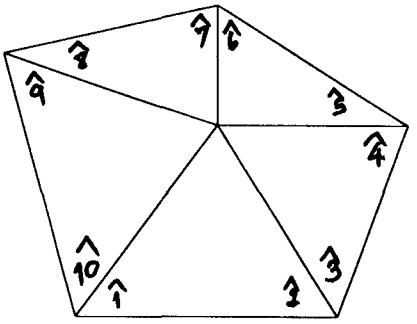
ผู้ออกข้อสอบ

1) Please describe the first scientific measurement of the earth's circumference. Name the person who did the measurement and explain his methodology as well as the name of the place, the date and time of his expedition. Also compare the result of his measurement with the accepted current figure. (15 points)

2) Prove that the trigonometric condition is also applicable with a pentagon ABCDE. (20 points)
Hint: Prove that $\sin \hat{1}\ \sin \hat{3}\ \sin \hat{5}\ \sin \hat{7}\ \sin \hat{9} = \sin \hat{2}\ \sin \hat{4}\ \sin \hat{6}\ \sin \hat{8}$



3) From the three available control points in the field L, M and R, their coordinates are given as

$X_L = 24{,}933.356$ m. ; $X_M = 25{,}078.670$ m.

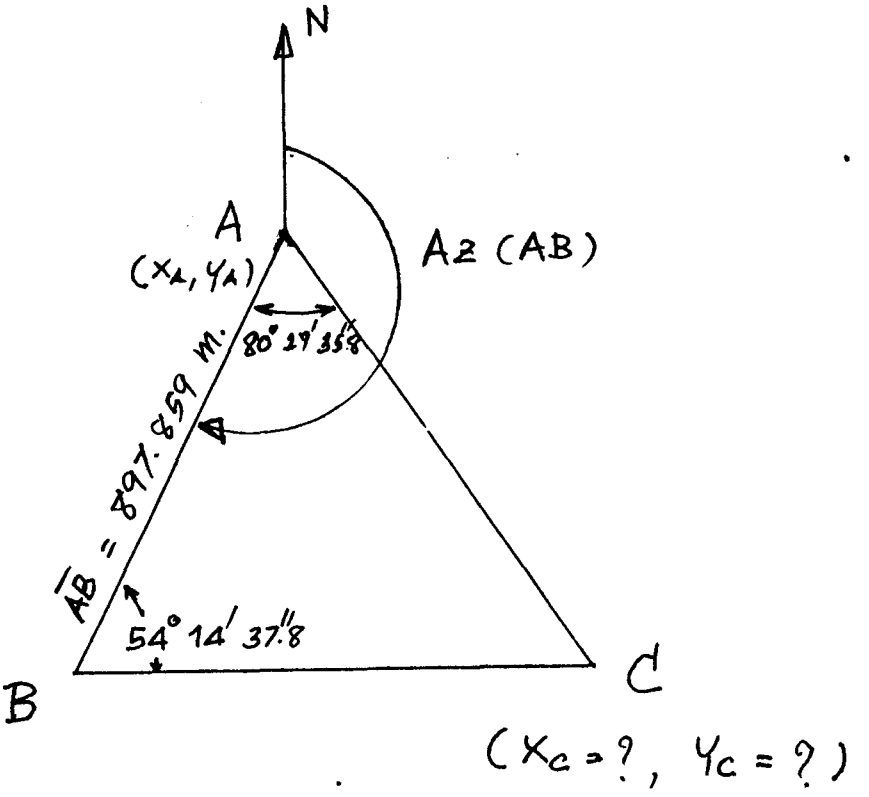
$Y_L = 30{,}082.605$ m. ; $Y_M = 29{,}693.183$ m.

And $X_R = 29{,}984.819$ m.

$Y_R = 24{,}424.243$ m.

The horizontal angels $\hat{LPM}$ and $\hat{MPR}$ were observed and measured. Their numerical values were given as $\hat{\alpha} = \hat{LPM} = 26°34'50"$ and $\hat{\beta} = 44°15'15"$ respectively. Compute the unknown coordinates of the station P. ($X_P = ?$, $Y_P = ?$) (30 points)

4) The unknown station C was located by intersection method. Stations A and B are the two triangulation stations whose baseline distance AB was measured. The distance AB is 897.859 m. The azimuth AB was known to be 235°20'32". And the coordinates of station A are X_A = 1,421,231.304 m. , Y_A = 521,304.009 m. The measured horizontal angels $\hat{BAC}$ and $\hat{ABC}$ are 80°27'35.8" and 54°14'37.8" respectively. Compute the unknown coordinates of the station C. (X_C = ?, Y_C = ?) (20 points)



5) Name the types of controls and explain their properties of these controls which are very common in civil engineering projects. (15 points)