

**Ce 114 Geomatics
Winter 2018
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& Dr. Jim Nelson**

**Name:
Lab Section:
Date:**

This is an editable Word document. Students should provide their name and lab section. If questions are part of the lab exercise, students should answer them in the space provided below each question. All answers and required screenshots should be inserted in the space provided in this document. Students should save this document as a PDF and submit to Learning Suite.

Laboratory Exercise #1 – Introduction to Survey Equipment and Setup

Background

In almost every area of engineering and construction, we deal with measuring distances and angles. The total station, prism rod, and tripod are some of the surveying equipment used to make these measurements. The purpose of this lab is to familiarize you with this equipment, including the set-up, operation, and takedown. This lab is designed to prepare you for future surveying labs. By the end of this lab, you should be able to set up the total station, take a horizontal distance measurement, and measure a vertical and horizontal angle. Some calculation problems have been included which will prepare you for required calculations in future surveying labs. This lab includes Parts and Functions of the Total Station document, the Pass-Off sheet, the Survey Calculation Problems page, and instructions for how to set up the survey equipment. An appendix is provided as a reference for determining significant figures in your calculations.

Procedure

1. Your TA will show you the parts of the total station. Fill out the parts of the equipment and their functions below.
2. Your TA will show you how to set up and operate the equipment. You will then break into groups of about 6 to practice setting up the equipment and measuring distance, horizontal, and vertical angles.
3. To complete this lab, you need to pass off that you can set up and take the previously mentioned measurements. Your TA will pass off one member of your group. That group member will then be able to pass off the rest of the group members. If you are unable to pass off the setup and operation of the equipment during lab, you will need to schedule a time to meet with your TA to pass it off before the following lab session.
4. A pass-off sheet is attached to this lab that you need to bring with you. Once completed, you need to scan the pass-off sheet (there are scanners in the 4th floor CAEDM lab) and upload it to Learning Suite.
5. Calculation problems are included below. These problems will prepare you for the calculations you are to do in the future surveying labs. Complete these problems on a separate sheet (make sure to show your work!) scan them, and upload them to Learning Suite with the pass-off paper. **Please combine your pass-off paper PDF and the calculations PDF into a single file.** This can be done by using the Adobe software found on the computers in the CAEDM labs.

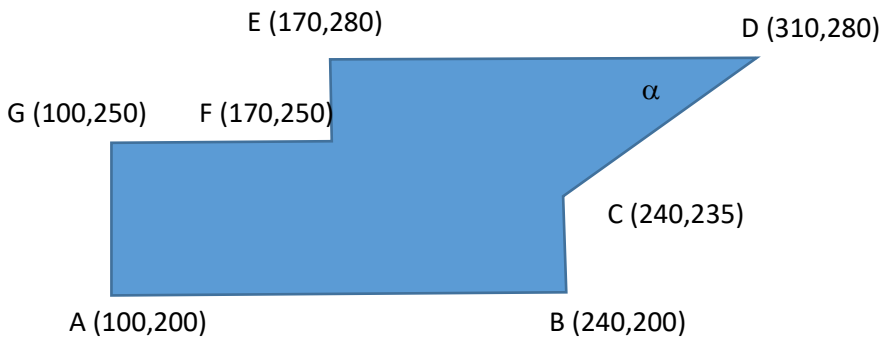
The Parts and Functions of the Total Station





Survey Calculation Problems

1. Given the shape with coordinates shown:



Find:

- a) The distance from A to D
- b) The area of the shape
- c) The angle α at D

2. Convert the following from Degrees, Minutes, Seconds to Decimal Degrees

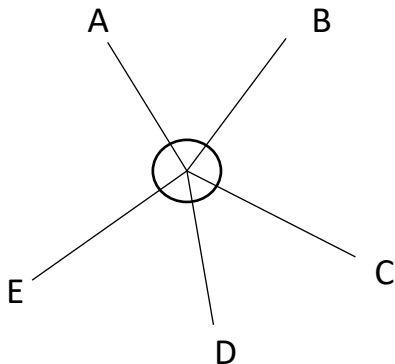
- a) $43^{\circ} 37' 14''$
- b) $164^{\circ} 08' 42''$

3. Convert the following from Decimal Degrees to Degrees, Minutes, Seconds

- a) 18.745
- b) 143.248

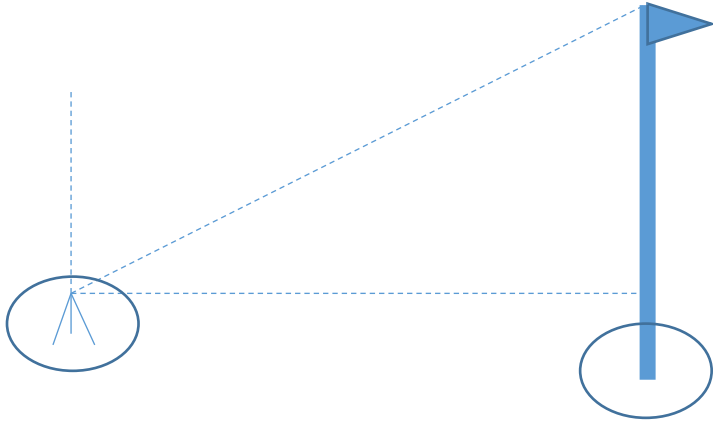
4. Determine the Angle $\angle CD$ given the following:

- a) $\angle AB = 47^{\circ}$
- b) $\angle BC = 95^{\circ}$
- c) $\angle DE = 56^{\circ}$
- d) $\angle EA = 113^{\circ}$

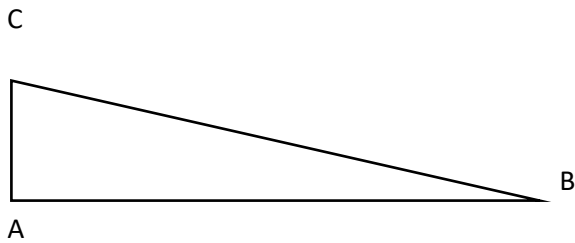


5. From the following determine the height of the flag pole

- a) The height of the instrument measurement on the flag pole is 5.2 feet
- b) The horizontal distance measured to the flag pole is 128.62 feet
- c) The zenith angle measured to the top of the flag pole is $38^{\circ}24'51''$



6. If the distance AB = 43.76 feet and the angle at B is $22^{\circ}34'$ then what is the distance BC?



Deliverables

Fill in the answer sheet at the end of this document (last page). Report the following

1. Parts and Functions of the Total Station filled in (15 points, 1/named item)
2. Survey Calculation Problems (10 points, 1/answer)
3. Attending lab, watching the demo, practicing it yourself (5 points, attendance recorded in lab)

Submit only the answer page of this lab. Type your answers into the boxes/spaces indicated using the correct units. Print only that page using the print to pdf function and submit that page.

Lab 1 Answer Document

Name:

Date:

Section:

By writing my name on this line I assert that I attended lab, watched the demonstrations, and practiced setting up the total station: type your name in this space

	Parts of a Total Station
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

	Answers to Survey Problems
1a	
1b	
1c	
2a	
2b	
3a	
3b	
4	
5	
6	

