

Exercise I

- Equipment needed:
 - 100' tape
 - Field Book
 - Two Wire Flags
 - Calculator
- Procedure
 - On reasonably level ground and using a tape measure 100' in horizontal distance. Remember to keep the tape tight while measuring the distance. Place a wire flags at the beginning and end of the 100' course. Pace up the course counting your steps. Record the number of steps in the field book. Then pace back. Record in field book again.
 - Average the number of steps taken in both directions and divide 100 by the average number of steps.

Example

1st- 36 steps

2nd- 35 steps

$36 + 35 / 2 = 35.5$ average number of steps per 100'

$100' / 35.5 = 2.8\text{ft}$ per step

Extra Credit

- Layout another pacing course on a sloping area.
- Using the BREAK TAPE method, layout a 50' or 100' pacing course.
- Pace the course uphill twice and average the number of steps.
- Do the same downhill.
- Calculate your average step length going up slopes and your average step length going down slopes?

Exercise II

- **Equipment**

- Hand Level, Abney level, or Clinometer
- Jake Stick
- Leveling Rod
- Tape
- Field Book
- Calculator
- Two flags

- **Procedure**

- On sloping ground, set two flags into the ground 25' apart. Use the Break Tape Method to measure the distance. Label the flags A and B, with A being the highest in elevation.
- Utilizing a hand level, jake stick and leveling rod determine the difference in elevation between the two flags to the nearest 0.1'.
- Record the rod readings on a field book sheet.
- Subtract the rod readings to determine the difference in elevation.
- Then determine the Slope and Grade of the ground between the flags.

Exercise III

- Equipment

- Auto Level
- Tripod
- Leveling Rod
- Field book page
- Calculator
- Two flags

- Procedure

- Two flags will be placed in the ground by the instructors. A TBM with an elevation of 100' will also be selected for you.
- Do a Bench Level Circuit to determine the elevation of the ground at the flags. Close back to the TBM.
- At least 3 turning points must be completed.
- Each crew member will complete a level circuit in each crew position. Determine the vertical error in the survey.
- Keep the field notes in the correct form.
- Draw a sketch of the survey in your field book.
- Pace the distance between the TWO FLAGS and determine the distance between using your personal step length from Exercise I.