



Heybrook Ridge bearings on a fine winter day.

**Pre Trip Plan: Wilderness Navigation Fieldtrip**

Most backcountry trips are safer and more enjoyable with thorough pre-trip work, including navigation. Your instructors expect you to complete some tasks before the Wilderness Navigation Fieldtrip (FT).

**Bring this hard copy sheet** to help satisfy the navigation planning portion of your FT grade.

**Navigation Tools Checklist: Ten Essentials +**

"1.) *Navigation system: This contains, at a minimum, a topographic map of the area and a compass. It might also include an altimeter, a GPS receiver, a whistle, and route-marking materials.*" (Burns & Burns, *Survival notes*, p.91)

- Baseplate, declination adjustable compass from recommended list. Tape on name. Attach lanyard.
- USGS Index & Baring 1:24000 maps w/ your name in upper corner & folded to fit in Ziploc bags
- Optional Altimeter or Smart Phone Altmtr app
- Optional GPS tool or Smart Phone GPS app
- Whistle
- Watch or other Time Piece
- One gallon Ziploc bags (for maps& problem set)
- Headlamp w fresh & spare batteries
- 2 sharpened #2 pencils or mechanical pencil
- Reading glasses and Optional small magnifier

**Find and Do**

- If needed, set your declination to 16 degrees East. Will deal with further corrections on site.
- Review Chap 1-5, Burns & Burns
- Read B&B pp. 96-101, UTM Coordinate System
- Read B&B pp. 106-103, Distance & Slope
- Read B&B Chap 8, The Altimeter
- Read B&B pp. 144-146, The GPS System
- Weather forecast, Index WA
- Sunrise \_\_\_\_\_ a.m.      Sunset \_\_\_\_\_ p.m.
- Car Pool? See Opt-In- Your Profile/Preferences

**Work Burns & Burns exercises, pp. 180-183 (pp. 130-133, 2<sup>nd</sup> Edition, 2004)**

11. Road distance point K to W:  
 \_\_\_\_\_Miles \_\_\_\_\_Feet \_\_\_\_\_Meters
12. Elev: P\_\_\_\_ L\_\_\_\_ Y \_\_\_\_ X \_\_\_\_ M\_\_\_\_

16. Slope bearing pt T: \_\_\_\_\_

20. Where are you? \_\_\_\_\_

21. Where are you? \_\_\_\_\_

**Work these problems using topos and handouts.**

**FT1.** What are the elevations just off HWY 2 at:  
 Parking area \_\_\_\_\_ (Just up N spur road E of TH)  
 Trail Head (TH) \_\_\_\_\_ Tower (Radio Facility) \_\_\_\_\_

**FT2.** What is the elevation gain from the final tight switchback to the tower? \_\_\_\_\_

**FT3.** Describe the slope just south of the tower.  
 Fall line bearing \_\_\_\_\_ Slope Angle \_\_\_\_\_

**FT4.** What are UTM coordinates at the tower?  
 Datum \_\_\_\_\_ Zone \_\_\_\_\_ E \_\_\_\_\_ N \_\_\_\_\_

**FT5.** Altitude under power line heading east from the tower on the forest road? \_\_\_\_\_

Print Your Name: \_\_\_\_\_

Year Joined The Mountaineers: \_\_\_\_\_

Also Enrolled in:

Basic Climb    Alpine Scramble    Snowshoe    \_\_\_\_\_

This is the evaluation criteria for the Field Trip, as well as a quick reference for the items that will be covered.

**Wilderness Navigation Fieldtrip Grade Card**

Student Name \_\_\_\_\_

Email \_\_\_\_\_

**E for excellent (should teach now), G for good (most students)**

**M for marginal (needs work) or NS for not satisfactory**

- Completes Pre Trip Plan tasks
- Carries 10 Essentials
  
- Determines ~point position on topo map
- Takes bearings on targets (at least 9 good bearings)
- Uses altitude and GPS UTM position to navigate
- Determines and uses slope to navigate
  
- Landfall navigation problem (G +/-2°, OK +/- 4°)
- Lunch break—uses multiple data sources to locate
- Final problem (E within 1°, G within 2°, OK within 4°)
- Copes with field trip conditions
  
- Safety—displays situational awareness in party
- Cooperation/Effort as member of larger party
- Physical conditioning, copes with any limitations
- Overall assessment of Wilderness Navigation skills

Comments \_\_\_\_\_

Instructor(s) \_\_\_\_\_ Date \_\_\_\_\_

(Rev 17Oct2015)

# Wilderness Navigation Field Trip – Student Information Packet

Heybrook Ridge, Index WA

**Field trip sign-up:** Sign up on line at [www.mountaineers.org](http://www.mountaineers.org) (preferred) or via the clubhouse at 206-521-6001. Sign-up is first-come first-served, and will close at noon on the Tuesday before the field trip. You must sign up to participate. And there is a Pre Trip Plan (homework) to complete.

## **PARKING IS VERY LIMITED - PLEASE CAR-POOL !!!**

You can register to carpool on the Mountaineers website through Your Account, specifying whether you would prefer to ride or drive and your preferred carpool area. This will make your contact information available so that you can connect with other participants to arrange a convenient meeting point such as a Park and Ride.

**Field trip info coordinator** (email preferred, do not call after 8:30 pm, or before 9:00 am): the Day Lead unless specified differently in the reminder email the week before the field trip.

Don't even think of calling the night before the field trip. It is your responsibility to sort everything out before hand.

**Required equipment:** This entire information packet (you will need it – READ it before you go)

- The 10 essentials, including a suitable compass and regular pencils (not pens)
- Food for lunch and 2 liters of water or other beverages
- Two or more large **zip-lock bags** to store your papers in (keep this packet dry)
- USGS Index map & USGS Baring map
- Full outdoor gear (except snowshoes & ice-axe) - i.e. polypro, insulating layers, raingear, heavy hiking or mountaineering boots, etc. (No cotton)
- Your Pre-Trip Plan sheet including more equipment detail

## **When to be there:**

Arrive by **6:45 a.m.** ... You must be ready to go by 7:15 including boots on, rain-gear on (if needed), etc. then checked in before 7:30. Getting ready takes 30 minutes (it really does).

Do NOT expect to be done before 5:00 p.m. We strongly recommend that you make no plans for the evening -- you will be tired, hungry and in need of a shower -- by the time you are home and settled you will be well into the evening. People who expect to leave early are always disappointed.

## **Directions to Heybrook -- and Required preparation:**

See the schematic map at the back of this info packet. Heybrook Ridge is on the way to Stevens Pass. **READ this entire packet before you go ... fill out your pre-trip exercise sheet....it will help tremendously!**

# LEAVE NO TRACE AT HEYBROOK RIDGE

- 1) Carry out all garbage, and everything else you brought in
- 2) Use the provided blue-bags to carry out solid human waste & toilet paper
- 3) If you see trash, please pick it up. Leave things nicer than they were when you arrived.

Be responsible, have fun and learn a lot !!!

## EMERGENCY RESPONSE PLAN - HEYBROOK RIDGE

A copy is provided to all students and instructors

### ACCIDENT RESPONSE RESPONSIBILITIES

Field Trip/Site Leader:

- 1) Coordinate evacuation with area leader and first aid leader.
- 2) Provide additional manpower as required.
- 3) Contact ambulance, hospital, and county sheriff as required.
- 4) Contact injured person's family.
- 5) Report accident to club and appropriate committee chair(s).

Area Leader:

- 1) Assume field trip leader's responsibilities as necessary, notify other area leaders of accident plan (practice may or may not continue depending on the severity of the accident).
- 2) Ensure immediate first aid is given to the injured person(s).
- 3) Contact nearest area leader on radio (channel 6 code 17)
- 4) Deliver accident report form to field trip/site leader with evaluation of seriousness of the injury and type of evacuation recommended.
- 5) Carry out evacuation as directed by field trip/site leader. Be aware that there is a gated Forest Service road down the back side (north side) of the site to the highway in Index. The road heads downhill halfway between the stumps and the fire tower, and is one of the obvious forks as you come in to the field trip site. The field trip leader has a key to the gate which is located at the start of the road, near the state highway in Index. In general, this road can be negotiated by pickup truck or car, unless covered with snow. The road also continues east towards Baring to exit onto US HWY 2—same gate key.

First Aid Leader (designated on the spot, based on available skills):

- 1) Ensure proper first aid is provided.
- 2) Have someone else complete thorough physical examination to determine all injuries.
- 3) Ensure stabilization of victim's condition.
- 4) Go to hospital with victim and stay until situation is under control. Report to field trip leader.

### LAW ENFORCEMENT

Heybrook Ridge is located in Snohomish County, WA. At Township 27 North, Range 10 East. The majority of the field trip takes place in Sections 20 and 21. The hike up the trail to the lookout goes through the east side of Section 19.

The Snohomish County Sheriff is the law enforcement agency to contact. Dial '911' and ask for the Snohomish County Sheriff.

### MEDICAL EMERGENCY

Valley General Hospital - 14701 179th Avenue SE - Monroe, WA

(360) 794-7497

From Heybrook Ridge Valley General Hospital can be reached by driving west on SR-2. Proceed through Monroe. Just past the SR-522 intersection/overpass you'll come to the intersection at 179th St. SE (Valley View Road). Turn left onto 179th St. SE, heading south across the railroad tracks. Valley General Hospital is on the immediate left.

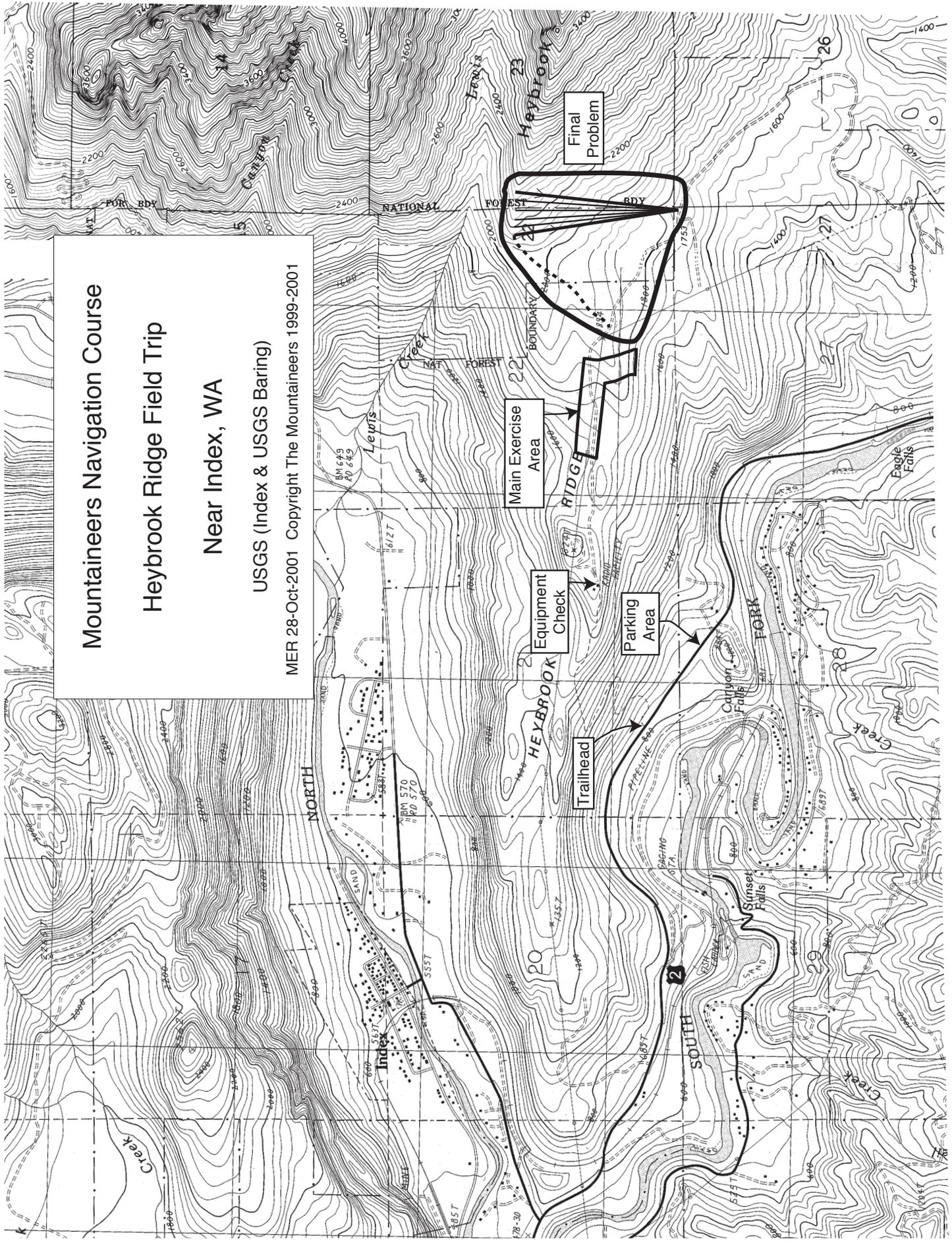
# Mountaineers Navigation Course

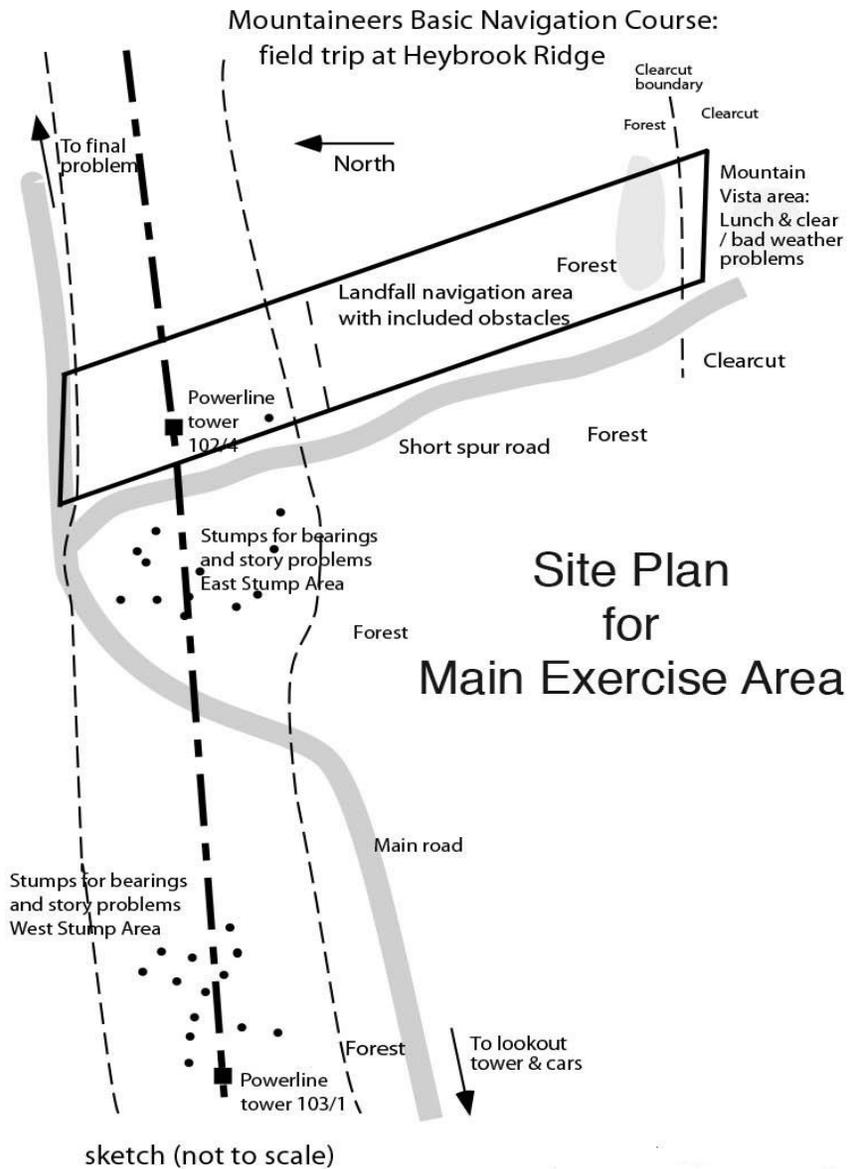
## Heybrook Ridge Field Trip

### Near Index, WA

USGS (Index & USGS Baring)

MER 28-Oct-2001 Copyright The Mountaineers 1999-2001





### Timetable for Heybrook Navigation field trip

**Note that all times after Orientation are subject to change according to weather and season. Listen to the Leaders!**

6:45	Students arrive, (takes 30 min. to get ready)
7:15	Students 100% ready to go
7:15 - 7:30	Student check-in
7:30 - 7:50	Student orientation
7:50 - 9:30	Hike to exercise area, including break for equipment and fitness check (15 min)
9:30--11:20	Take bearings (45 min) done by 10:15 Story problem (35 min) done by 10:50 Landfall navigation (30 min) done by 11:20
11:20 - 12:00	Catch-up, assemble at mountain vista, Eat lunch, pack up again, good or bad weather exercise (only 40 minutes)
12:00 - 12:15	Assemble, instructions for final problem
12:15-2:30	Final problem (navigation in the woods)
2:45	Start hike to cars
4:00	Arrive at cars, check out with leader
just before 5:00	Departure (only after <b>everyone</b> is down and checked in) -- this will be in the dark

## Wilderness Navigation Course - Description of Exercises - Heybrook Ridge Navigation Field Trip (Saturday & Sunday)

### Teaching objectives for the field trip

At day's end, each student should be able to:

- take compass bearings accurately
- navigate with map and compass
- perform landfall navigation
- determine position with multiple navigation tools
- navigate through the woods
- be accustomed to bushwhacking, possibly while out in the rain all day
- understand his or her own physical conditioning and equipment needs.

### Before leaving the parking lot

When directed, form groups with instructors. Make introductions. Instructors will ask you to inform them of any medical conditions or problems privately. Specifically mention asthma, diabetes, allergies, recent injuries, illness, or other conditions which might affect you. At this time, instructors will check for cotton clothing or other unsuitable gear. Every year, we have a few students wearing cotton.

### Location exercises: these will occur throughout the day

**GOAL:** To learn how to use all available information from observation, map, compass, altimeter, timepiece and GPS to determine and keep track of position on the map, and in the real world.

**METHOD:** Stay alert, pull out your map when directed, use your compass to stay oriented to North and South. If elevation and UTM coordinate information is available, use it to confirm (or not!). Pay attention to what information, tool or technique is most useful at different points.

### 1 Equipment check at lookout tower

Instructors inspect and evaluate each student's equipment and fitness, specifically including:

- physical conditioning
- ten essentials
- clothing and boots
- packs (and packing job)

Your instructors will help you identify what works and what doesn't work with your equipment. Instructors will offer advice based on their experience and show you examples of good equipment and packing choices, often from their own gear. This is a great opportunity to ask your equipment and fitness questions. Instructors will note any deficiencies in your fitness or equipment on grade cards. Be sure to get a drink and snack here.

### 2 Taking bearings

Groups are assigned to a stump area (east or west) by an area leader. Instructors will provide direction on how to take bearings.

**GOAL:** Take nine bearings accurate to  $\pm 2^\circ$

**METHOD:** Each student goes to a numbered stump (assigned by the instructor), and takes bearings on the three lettered stumps indicated. Check the accuracy of answers with your instructor before proceeding.

If any bearing is in error by more than  $2^\circ$ , the student tries again (you will not be told the correct answer until you are within  $2^\circ$ ). The process is repeated until each student has taken nine bearings accurate to within  $\pm 2^\circ$

In case of consistent difficulties, instructors will consult with an area leader - if there are inaccuracies, we need to know so that they can be fixed. The instructors have a Calibration Station that can be used to determine and compensate for technical problems with specific compasses.

Eastern stumps - For stump G, site from the north side.

1	2	3	4	5	6	7	G	K
A	B	B	A	A	E	A	H	4
B	D	C	C	D	F	D	5	D
E	Y	K	G	F	G	G	F	G
-	-	-	-	-	-	-	W	O

Western stumps (If you aren't sure which area, ask !)

1	2	3	4	5	6	7	8	8
A	A	B	A	C	B	C	U	2
E	B	D	D	E	C	D	T	3
F	G	G	F	G	E	E	J	-

For each stump assigned in the top row, fill in the bearings to the corresponding stumps below it.

### 3 Story problems

**GOAL:** To solve a short story problem using map & compass to navigate around a controlled course (from stump to stump). To take the skills developed in part 2 (Taking Bearings), and consolidate them.

**METHOD:** Students work in pairs, on a story problem assigned to them by their instructor. Follow the directions in the story **IN THE ORDER LISTED**, and write down your answers (see the accompanying pages with stories and maps - - be sure to use the right map, there is one for east, one for west).

Instructors are available to help students and check student answers. Distances can be measured on the map, or estimated by eye. We are not teaching the use of pacing to measure distance, although instructors may describe the concept to students.

### 4 Landfall navigation

**GOAL:** Follow an assigned bearing from one end of a course to the other end (about 700-foot long), arriving at the end no more than  $2^\circ$  off course.

**APPROACH:** There are three navigation methods taught in this exercise (leap-frog, landfall, obstacle avoidance), and two distinct phases (working in pairs; working singly but with a safety buddy).

**LEAP-FROG METHOD:** This method is used on snow or other featureless terrain, particularly in white-out conditions. Students work in pairs. Student B goes out a ways along the desired bearing, while student A directs him/her left or right. Student B then turns around, and takes a back-bearing on student B, moving until on the correct bearing. When the students agree, student B stays in place, and student A walks past, "leap-frogging" student A. The process is repeated. Lacking a fixed object (such as a tree), your partner becomes the fixed object used to keep track of position on the featureless terrain.

To take a back bearing, instead of reading the north pointing end of the compass needle (the pointy end, usually red) to take a bearing, use the south end of the needle (the back end, usually white) to take the bearing. The back bearing to your previous position, should have the same reading in degrees as the normal bearing did using the north end of the needle. Instructors demonstrate this method for students.

**LANDFALL METHOD:** To follow a given bearing, sight along that bearing to an identified landmark (or object in the landscape) in the distance, then move to that landmark, and repeat the process as needed. This "sight-identify-move" process is called "landfall navigation". Accuracy can be checked by taking a back bearing each time a new landmark is reached.

**OBSTACLES:** Students must navigate around downed trees and over a ridge with steep rocky areas. It may not be possible to follow a bearing by walking along it. Instructors teach the students how to get around obstacles, while maintaining their ultimate heading.

**OBSTACLE AVOIDANCE:** To detour around an obstacle, walk a fixed distance out of your way before reaching it (i.e. 8 paces @ 90°), then the same distance in the opposite direction after it.



The steps are as follows:

1. Turn to a heading 90° off course
2. Walk in that direction, counting your paces.
3. Turn 90° back onto the proper heading

4. Walk past the obstacle
5. Turn 90° toward your old line of travel
6. Walk back the same number of counted paces. Turn 90° back onto the proper heading.

Instructors will demonstrate this method to students.

**THE EXERCISE:** Instructors assign each pair of students a starting location and a bearing. Instructors may assist students as needed throughout the exercise, but the result is the responsibility of each student.

Navigate in pairs across the powerline right-of-way using the leapfrog method. Arrange to do at least 3 "leaps" by the time you enter the trees. After crossing through the trees, individuals remain in pairs for safety, but navigate independently.

Navigate individually via the landfall method, and follow the assigned bearing to the end of the course. Partners must keep each other in sight, and stay with their partners in case of injury.

At the end, the course emerges into an open clear-cut area. Within about 50 feet, you should cross a 200 foot line of signs 20-feet apart (the finish line). Estimate their position crossing the finish line to the nearest 5 feet, based on the distance labeled on the nearest two signs on the finish line.

Record your starting letter and finishing distance, i.e. Start: B, Finish at 175'. **GRADING:** Each error of 2° results in being 20-25 feet off at the finish line. 75% of students finish within 45 feet (4°). Within 20 ft (2°) is an excellent result. More than 50 ft off is poor.

**Lunch** After arrival at the finish line for the landfall navigation, take a brief break, eat lunch, talk to others and enjoy the view. If you are behind, you will need to be efficient - you must be doing the next problem at 12:10, not just thinking about getting ready for it.

## 5 Mountain Vista Location Exercise

See the attached sheet for directions. The outcome of these problems will not directly affect your grade, but your general understanding of the material in them will.

## 6 Final Landfall Problem

**GOAL:** To navigate from the "launch" ridge through to the service road with reasonable accuracy in a reasonable amount of time (Please note that the service road is the 2nd road participants will reach. The first road reached is very overgrown, recognizable only because it is firm and flat for 6 ft.)

**METHOD:** Students navigate cross-country from the ridge in pairs from an assigned launch point along an assigned bearing. Each student pair receives a launch ticket with an assigned bearing. Write your names on the launch ticket. There are five launch points, lettered "A" through "E" along the ridge. Students travel in pairs for safety, and must keep each other in sight and sound contact. However, each student is to navigate independently using the "landfall method". Do not "Leapfrog" each other or consult on choices of landfalls. This problem tests your INDIVIDUAL skill and efficiency.

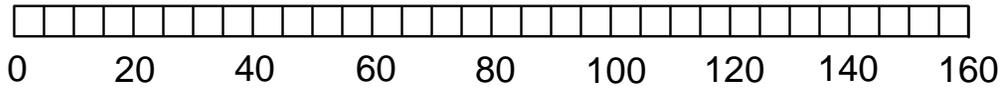
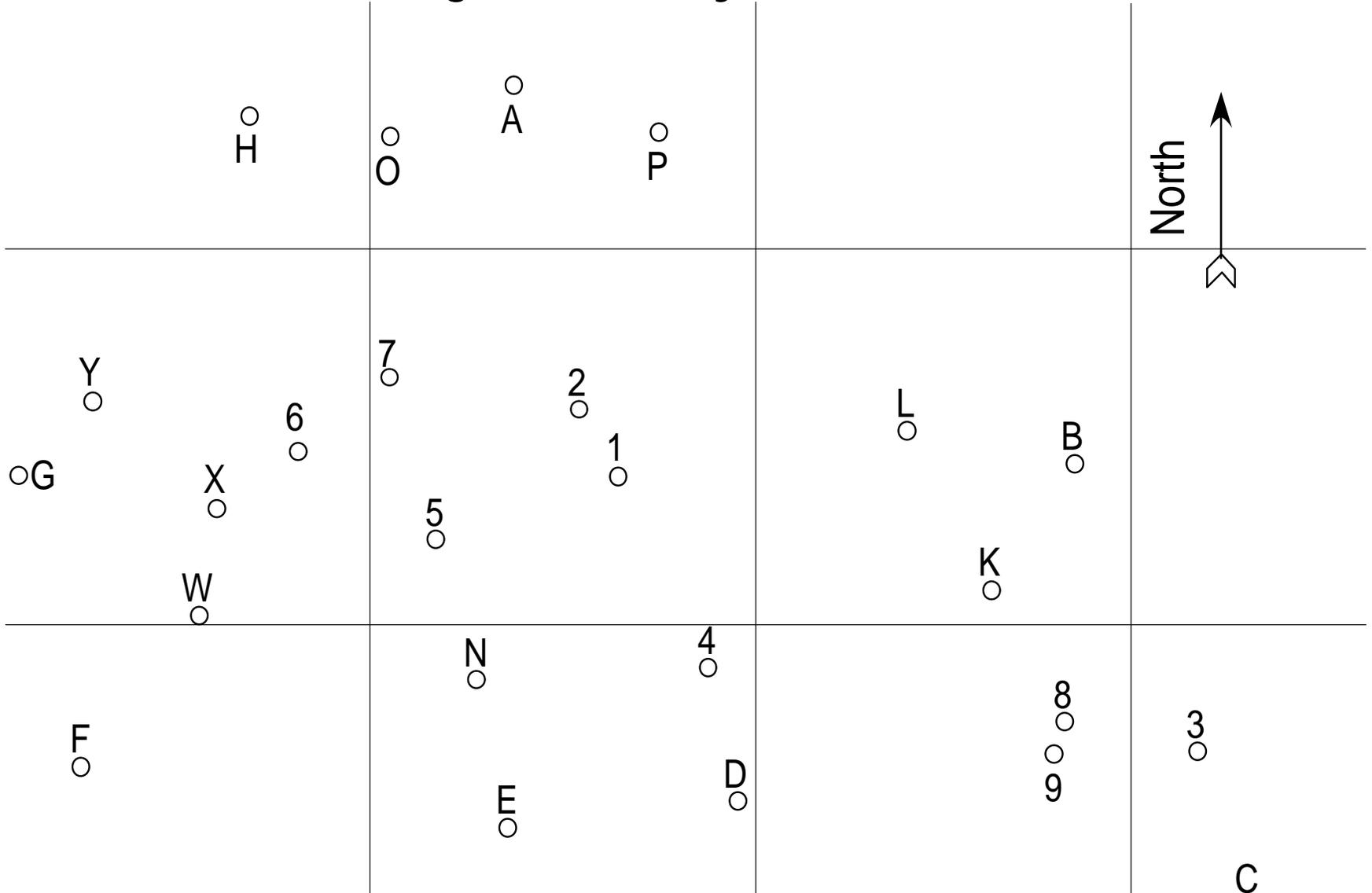
You should reach the second road in no more than 40 minutes. The leader will also assign instructors to launch points. At a set time after the last students have "launched" the instructors begin "sweeping" down after the students. Accuracy is determined in reference to numbered signs along the second road ("1" to "11") spaced at 200' intervals. When you reach the road, find the closest numbered sign, then report to a "catcher" who will let you know your accuracy. **DO NOT CROSS THE SECOND ROAD.**

If you reach the road near a sign without being swept, you will receive an "S" for the problem. The closer you are to the "correct sign" the higher your grade. If you reach the road outside the signed area, are swept by an instructor before you reach the road, or become lost, you will receive an "NS" grade. This almost never happens. Good Luck!

**NO-ONE** leaves the goal area until **EVERYONE** is accounted for. **NO EXCEPTIONS.**

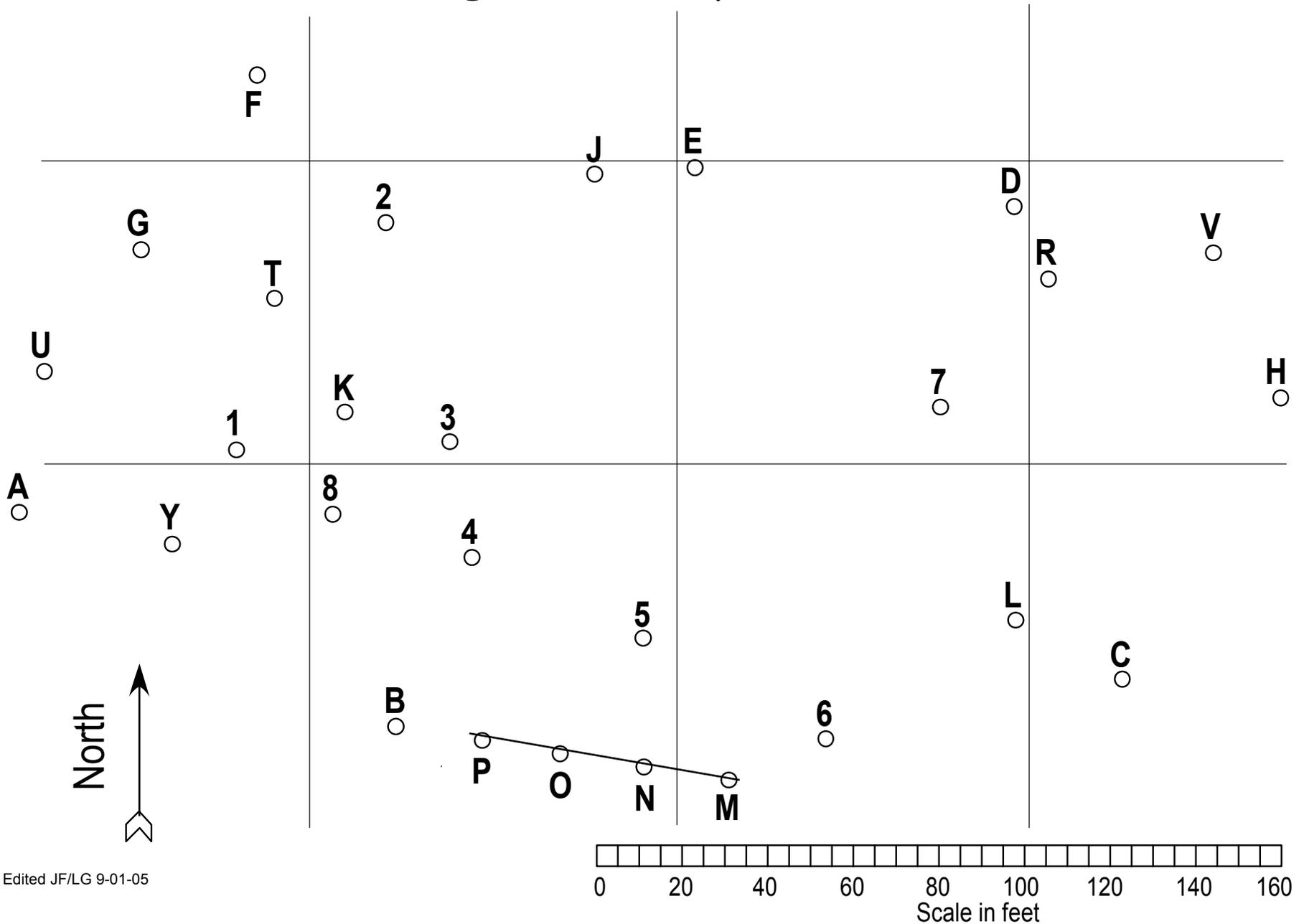
**Hike out, check out** - Do not leave parking area until told. Sign out by 1) turning in your grade card at the parking lot, and 2) having your name checked off the list. Then **WAIT** for release.

# Map of Eastern Stump Area Bearings and Story Problems



Scale in feet

# Map of Western Stump Area Bearings and Story Problems



## Story Problems: Eastern Stump Area

Story #E1	Story #E2	Story #E3	#E4
1. From point "Y" go 69 ft at 29°. Where are you? _____	1. From point "G" you see another point at 168°. Which point is it? _____	1. From point "W" go 132 ft at 31°. Where are you? _____	1. From point "O" go 71 ft at 145°. Where are you? _____
2. From the point you reached in step 1, you see another point at 116°. Which point is it? _____	2. How far away is it? _____	2. From the point you reached in step 1, you see another point at 131°. Which point is it? _____	2. From the point you reached in step 1, you see another point at 127° more than 160 ft away. Which is it? _____
3. How far away is it? _____	3. From point "G" go 135 ft at 52°. Where are you now? _____	3. How far away is it? _____	3. From stump "2" go 104 ft at 271°. Where are you now? _____
4. From the point reached in step 1, go 84 feet at 185°. Where are you now? _____	4. From the point reached in step 3, go 110 feet at 215°. Where are you now? _____	4. From the point reached in step 1, go 144 feet at 124°. Where are you now? _____	4. From the point reached in step 3, go to another point at 29°. Where are you now? _____
5. From the point you reached in step 4, go at 104° to another point. Where are you now? _____	5. From the point you reached in step 4, go 166 feet at 96°. Where are you now? _____	5. From the point you reached in step 4, go at 267° to another point. Where are you now? _____	5. From the point you reached in step 4, go at 185° to another point. Where are you now? _____
6. You may or may not have selected the correct point in step 5. If you are at the right point, you will see "3" at 103° and "4" at 279°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct point in step 5. If you are at the right point, you will see "L" at 332° and "B" at 33°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct point in step 5. If you are at the right point, you will see "H" at 5° and "Y" at 311°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct point in step 5. If you are at the right point, you will see "O" at 25° and "B" at 87°. What stump should you have reached in step 5? _____
7. From the point determined in step 6, travel at 325° to the berm across the road. If you are between two stakes, give both; if at one stake give it alone. _____	7. From the point determined in step 6, travel at 324° just across the road. If you are between two stakes, give both; if at one stake give it alone. _____	7. From the point determined in step 6, travel at 25° just across the road. If you are between two stakes, give both; if at one stake give it alone. _____	7. From the point determined in step 6, travel at 35° just across the road. If you are between two stakes, give both; if at one stake give it alone. _____

## Story Problems: Western Stump Area

Story #W1	Story #W2	Story #W3	Story #W4
1. From point “B” go 74 ft at 350°. Where are you? _____	1. From point “A” you see another point at 60°. Which point is it? _____	1. From point “L” go 81 ft at 50°. Where are you? _____	1. From point “5” you see another point at 56°. Which point is it? _____
2. From the point you reached in step 1, you see another point at 278°. Which point is it? _____	2. How far away is it? _____	2. From the point you reached in step 1, you see another point at 259°. Which point is it? _____	2. How far away is it? _____
3. How far away is it from the point reached in step 1? _____	3. From point “A” go 33 ft at 10°. Where are you now? _____	3. How far away is it? _____	3. From point “5” go 87 ft at 87°. Where are you now? _____
4. From the point reached in step 1, go 81 feet at 46°. Where are you? _____	4. From the point reached in step 3, go 57 feet at 73°. Where are you? _____	4. From the point reached in step 1, go 61 feet at 297°. Where are you? _____	4. From the point reached in step 3, go 96 feet at 360°. Where are you? _____
5. From the point you reached in step 4, go to the point at 103°. Where are you now? _____	5. From the point you reached in step 4, go to the point at 83°. Where are you now? _____	5. From the point you reached in step 4, go 288° to another point. Where are you now? _____	5. From the point you reached in step 4, go to the point at 277°. Where are you now? _____
6. You may or may not have selected the correct stump in step 5. If you are at the right point, you will see “7” at 220° and “H” at 117°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct stump in step 5. If you are at the right point, you will see “7” at 200° and “E” at 277°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct stump in step 5. If you are at the right point, you will see “4” at 210° and “F” at 282°. What stump should you have reached in step 5? _____	6. You may or may not have selected the correct stump in step 5. If you are at the right point, you will see “K” at 235° and “7” at 134°. What stump should you have reached in step 5? _____
7. From the point determined in step 6, leapfrog with your partner at 220° to a row of stakes in the fallen logs at the edge of the trees. Name the stake you come closest to. _____	7. From the point determined in step 6, leapfrog with your partner at 220° to a row of stakes in the fallen logs at the edge of the trees. Name the stake you come closest to. _____	7. From the point determined in step 6, leapfrog with your partner at 177° to a row of stakes in the fallen logs at the edge of the trees. Name the stake you come closest to. _____	7. From the point determined in step 6, leapfrog with your partner at 185° to a row of stakes in the fallen logs at the edge of the trees. Name the stake you come closest to. _____

# Navigation Field Trip – Lunchtime / Mountain Vista Exercise

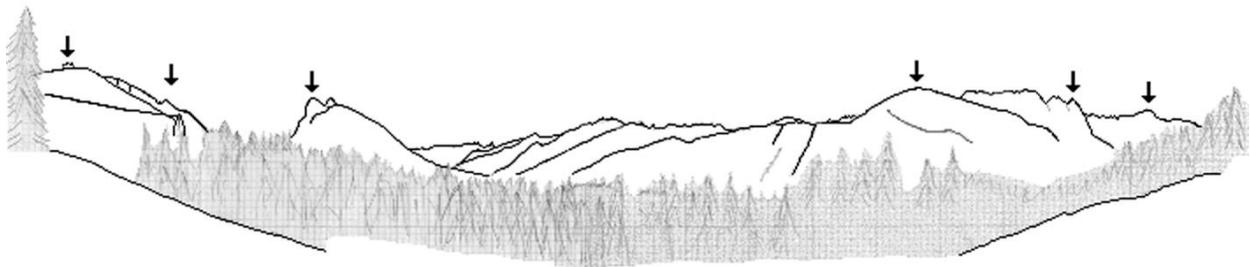
## Student Information

Timeframe: Time is limited. You may need to do this problem and eat your lunch at the same time.

**Goals:** To figure out where you are, how to get to where you are going next, how to get back to your starting point, using all possible sources of information. Discuss your answers with your instructors and group at each step of your work.

## Figure out where you are:

1. **Orient your map** - Orient map so that the top of the map points north (so that it matches the topography), using a relatively flat surface. Use a stump, rock, ground, or your pack. **Do not hold the map in your hands, because once you move the map, it will no longer be oriented.**
2. You are not standing at a **known landmark** (easiest method of knowing where you are).
3. **Dead Reckoning** – Where were you when you started the landfall problem? (Ask your instructor if you don't know.) What direction did you go? For how much time and at what pace (speed) did you travel? Estimate the distance. Plot where you might be now.
4. **Altitude and Slope** – Assume your altimeter says you are at 1820 feet. Which direction is downhill? Does that additional information confirm and refine your dead reckoning answer? Would the steepness of the slope and the shape of the slope (convex or concave in the vertical or horizontal direction) provide useful information unique to your location in this case? How far is the crest of the ridge above you?
5. **Landmark Identification and Distant Bearings** – Look for mountains and compare their shapes to those you see on your oriented map to identify them. Take bearings to the mountains shown below (or if they are not visible, get bearings from your instructors). You can also use man made (cultural) landmarks like power line towers and roads to help. Plot a bearing that is most likely to help reduce uncertainty of your position. Does it help?

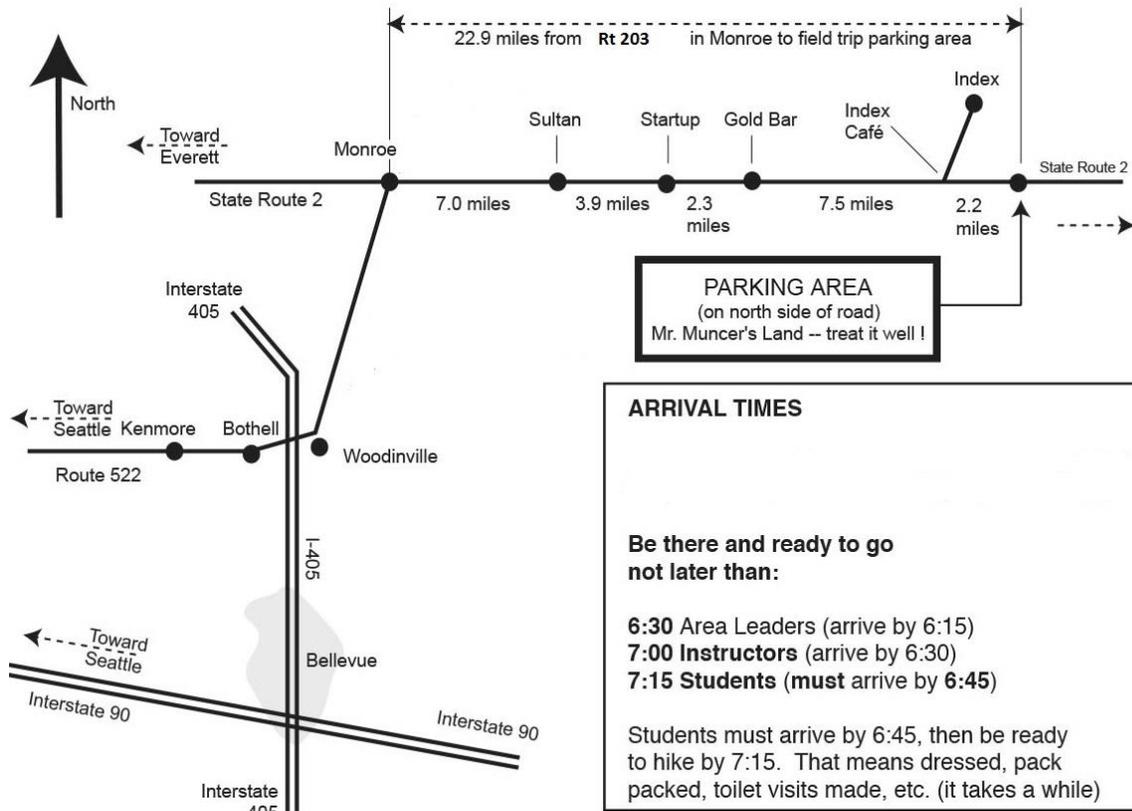


6. **GPS & UTM** – Your GPS gives your position as NAD27 10T 611701E 5295972N or WGS84 10T 611607E 5296169N. Plot the UTM coordinates for your map's horizontal datum on your map. Does it confirm your location as you determined using other methods?

## Figure out how to get where you are going next, and how to get home:

Figure out and sketch a route on your maps to your next destination, the final problem launch line on the crest of Heybrook Ridge from 2240 ft (point A) to 2450 ft (point E). Also sketch a route you would take to get back to the fire tower, the trailhead and your car. Estimate your travel times using your hiking speed and the distance. Given the current time, what is your latest allowable turn-around time if you want to get to your car by sunset?

# Driving Directions to the Wilderness Navigation Field Trip at Heybrook Ridge



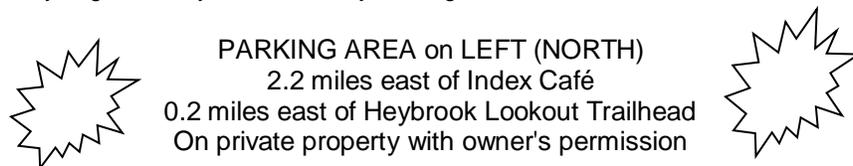
**From Seattle**, take I-5 N to Exit 175, then head E on 145th to Bothell Way NE/SR522. Turn left and follow it to Bothell, continuing right to stay on 522 heading E and N towards Woodinville and Monroe. **From Renton, Bellevue or Lynnwood**, take I-405 to Exit 23 (junction with SR 522). From **Lake City and Kenmore**, reach Bothell via SR 522, then continue east. Take SR 522 east past Woodinville, and then north to Monroe.

**In Monroe**, 522 ends at Route 2. Take the exit ramp that heads east on Route 2 toward Stevens Pass. From the intersection with E Main St/Old Owen Rd at a stoplight near the end of the commercial strip in Monroe it is 22.9 miles to the field trip parking area. This is 2.2 miles beyond the Index Café on the left, and 0.2 or 0.3 miles past the USFS Heybrook Lookout trail head (on left).

An alternative for users of Google maps is to type the latitude and longitude (47.805589, -121.529628) into the search box to obtain mapping directions.

Allow **65 minutes driving time from Bellevue** (SR-520/I-405 intersection), or **80 minutes from downtown Seattle** or the 65th Street park & ride. If you plan to stop for breakfast, bathroom or snacks, add more time (15 to 40 minutes).

When you arrive in the parking lot on Mr. Muncer's land, please **follow directions** for parking. He is kind enough to let us use his land --please care for it and respect his generous offer. Do not park so as to obstruct the road through the parking area - he drives large trucks up & down, and needs room to get by. Portable toilets will be located at the top of the road after the student / instructor check in area. Please -- no trash in the portable toilets. Like all Mountaineers events, you get to carry out whatever you bring in.



Please carpool. There is not enough space to allow for parking of single occupant vehicles. Sign up online to arrange carpools. Only if you sign up to carpool can you see contact information for all riders and drivers who have opted to share information. You must then contact each other - make arrangements to meet at a convenient location (such as a park & ride).

# Safe Travel to Heybrook Ridge

Driving to and from the field trip is RISKY. U.S. Highway 2 is a mountain road. It is up to you to stay safe!

Pull off and let impatient drivers pass you where you can. You'll see the ***Mountaineers Trip Ahead*** highway sign about 1000' before the parking area. Use your left turn signal as you approach the parking area to warn impatient drivers you are going to turn.

There is a blind curve immediately after the turn into the parking area--you will have **NO WARNING OF ONCOMING TRAFFIC**. Only turn if there is space for you to pull into the drive to the parking area.

**DO NOT STOP** on the highway. If you cannot turn left safely and promptly, **DRIVE ON PAST** the blind curve and turn around when you find a safe location. Our Forest Service permit does not allow field trip parking at the trailhead. If you park there, we will insist you move your car.

Light wand equipped parking helpers will direct you to check in, the porta-potties, and the staging area for students to complete gear adjustments and hear the briefing.

