

MAP AND COMPASS WORKSHEET - PEO 356 – BACKCOUNTRY NAVIGATION

The purpose of this worksheet is to provide you with the opportunity to review basic map and compass skills and review the travel route prior to participating in the Backcountry Navigation outing. Worksheets are due by the deadline specified on the course schedule - **late submissions are not acceptable**. A grade of 80% or better is required for a passing grade. Bearings must be no more than 2° off. Distances must be within one-tenth of a mile, and elevations must be within one contour interval. If a feature is between contour lines, split the difference. Collaboration with fellow classmates is highly recommended.

You'll need a compass and the course map. **The online pdf version denotes the travel route and campsites**. Use the online version to mark the travel route and campsite locations on your field map (which will be distributed in class).

A. CONTOUR INTERVAL – It should be apparent that there are 2 contour intervals on this map.

Contour interval of west side of map: ft. Contour interval of east side of map: ft.

B. ELEVATION ESTIMATIONS – estimate the following elevations

Elevation of trailhead: ft. Elevation of Camp 1: ft. Elevation of Camp 2: ft.

When calculating elevation gains or losses along a route, carefully assess the route's path in relation to the contour lines. In cases where the route comes close to, but does not touch a contour line, assume that this indicates a 1/2 contour interval change in elevation. If the route touches a contour line, consider this a full contour interval change in elevation. A reminder about terminology: *Total elevation gain/loss* means the total of ALL elevation gains/losses along the route. *Net change in elevation* is the elevation difference between two points. Total elevation gains minus total elevation losses MUST equal the net change in elevation between points. If it doesn't, recalculate!

	<u>TOTAL ELEV. GAIN</u>	<u>TOTAL ELEV. LOSS</u>	<u>NET CHANGE IN ELEV.</u>
Vans to Camp 1:	..... ft.	..... ft.	..... ft.
Camp 1 to Camp 2:	.....ft.	..... ft.	..... ft.
Camp 2 to back to vans:	.....ft.	..... ft.	..... ft.

C. DISTANCE ESTIMATIONS

As you learned in WS, linear (map) distance is different than adjusted (trail) distance, due largely to slope error and the difficulty of marking with accuracy where a trail is located on a map. For the purposes of this assignment, multiply linear distance by 1.3 to estimate trail distance. When estimating distance, follow the travel routes denoted on the map.

Vans to Camp 1 (along trail past Otter Lake/over hill 5872) linear miles x1.3 = trail miles
 Route between Camp 1 to Camp 2 (along red route): linear miles x1.3 = trail miles
 Camp 2 to the trail SW of Lower Erma Bell lake (along blue route): linear miles x1.3 = trail miles
 Erma Bell trail to vans (along blue route): linear miles x1.3 = trail miles

D. RATE OF TRAVEL AND TRAVEL TIME ESTIMATIONS

NOTE: Group travel in general is slow – even slower when navigation training is an integral part of the experience. Plan to average the following rates of travel:

DAY 1 – 1 MPH plus 10 minutes per hour for breaks due to navigation practice.

DAY 2 – same as DAY 1

DAY 3 – 1.5 MPH plus 5 minutes per hour for breaks. Travel/routefinding is becoming more efficient, break time should be shorter, and the last part of the route is along a well-developed trail.

	<u>RATE OF TRAVEL</u>	<u>TRAVEL TIME w/out BREAKS</u>	<u>BREAK TIME</u>	<u>TOTAL ESTIMATED TIME</u>	<u>PROJECTED GROUND SURFACE</u>
<u>Day 1 Route</u>					
Vans to Camp 1	1 mph	.....	.....	.....	(trail)
<u>Day 2 Route (red)</u>					
Camp 1 to Camp 2	1 mph	.....	.....	.....	(mostly open off-trail)
<u>Day 3 Route (blue)</u>					
Camp 2 to Roadhead	1.5 mph	.....	.....	.....	(mostly rugged off-trail/trail)

Arrival time at Camp 1: p.m.
 Arrival time at Camp 2: p.m.
 Arrival time back at vans: p.m.

Assume the following:
 - day 1 departure from trailhead at 11:30 a.m.
 - day 2 departure from Camp 1 at 2 p.m.
 - day 3 departure from Camp 2 at 5:30 a.m.

D. MAP, COMPASS AND GPS CALCULATIONS

- Provide the **magnetic north bearing** between the following points:
 - Day 1: Skookum Cr. Trailhead (center of tent icon) to the x at peak 4470 (w of Otter Lake). °
 - X at peak 4770 to X at peak 5872. °
 - X at peak 5872 to Camp 1. °
 - Day 2: Camp 1 to Camp 2 °
 - Day 3: Camp 2 to the point where the blue travel route meets the trail between Lower and Middle Erma Bell Lakes °
- You are standing on the shore of a lake. A magnetic north bearing on Peak 5872 reads 41°. Your altimeter reads 4500'. What lake are you standing beside?
- You are on a peak and decide to practice triangulation. A magnetic north bearing on Peak 4770 reads 240°. A magnetic north bearing on Peak 6602 (S of Irish mtn. along the Cascade crest) reads 101°. Your final magnetic north bearing, on peak 5215 (directly north of Helen lake) reads 175°. Where are you?
- Provide the precise location of Camp 1 using the **LANDMARK REFERENCE SYSTEM**. To use this system, find a prominent feature near our campsite to use as a reference. For the purposes of this assignment, use the summit of the Irish Mtn. Provide the following:
 - a) a general description of our campsite location (e.g. elevation and physical characteristics);
 - b) the **MAGNETIC BEARING** and **LINEAR DISTANCE TO** our campsite **FROM** the summit of Irish mtn.
- Provide the UTM coordinates for the following locations:
 - a) Camp 1:
 - c) Camp 2:
 - d) Where the travel route meets the trail just NW of Middle Erma Bell Lake on day 3: