

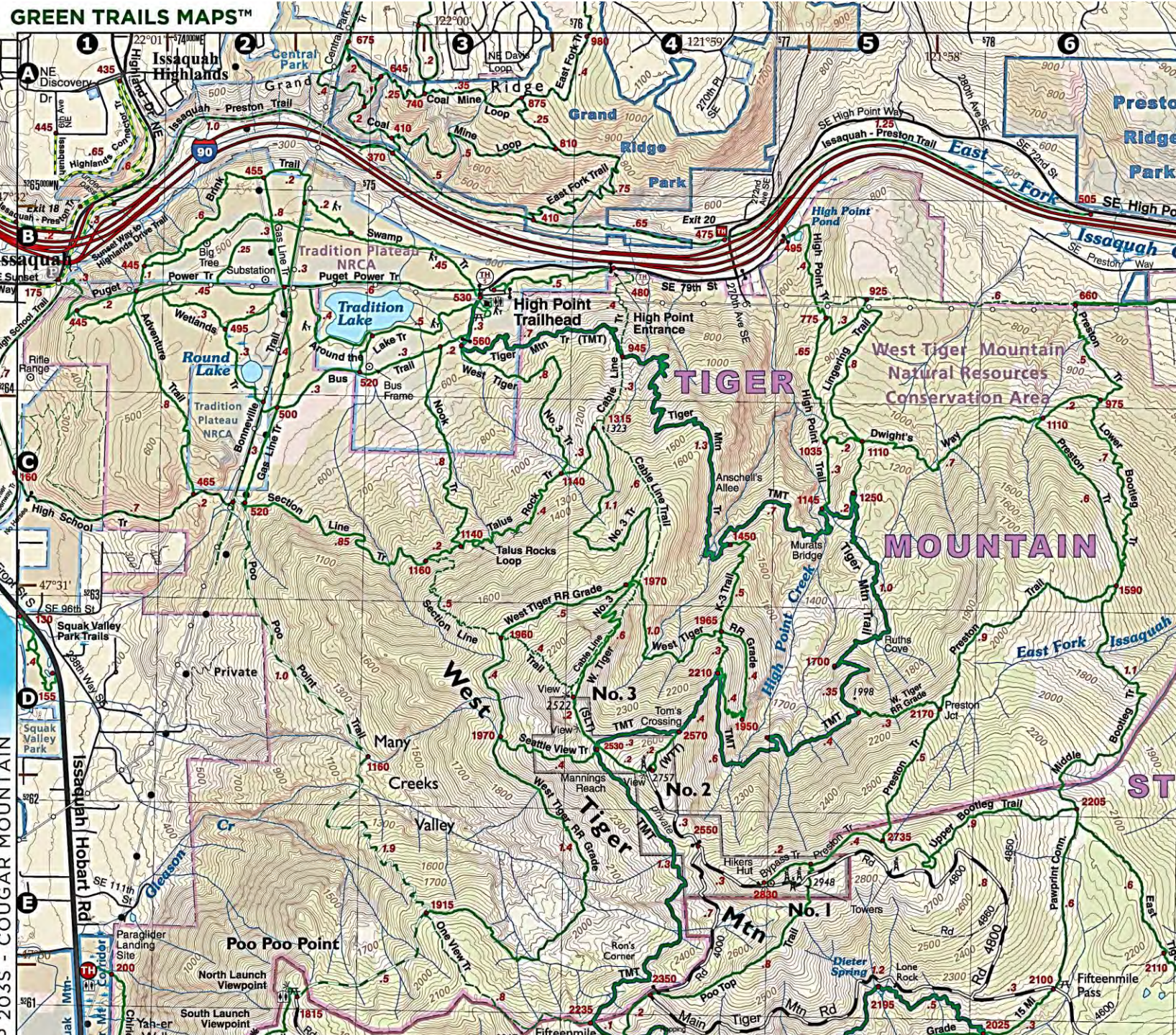
A photograph of two people, a woman with dark hair and a man with short brown hair, sitting on the grass and looking at a large map spread out on the ground. The woman is wearing a bright pink jacket and a blue patterned scarf. The man is wearing a green long-sleeved shirt. A small compass is visible on the map. The background is a grassy field.

Staying Found” Tools and Concepts

Pre-work for May 16 2023 Virtual Seminar

Introduction to the Pre-Work Assignment

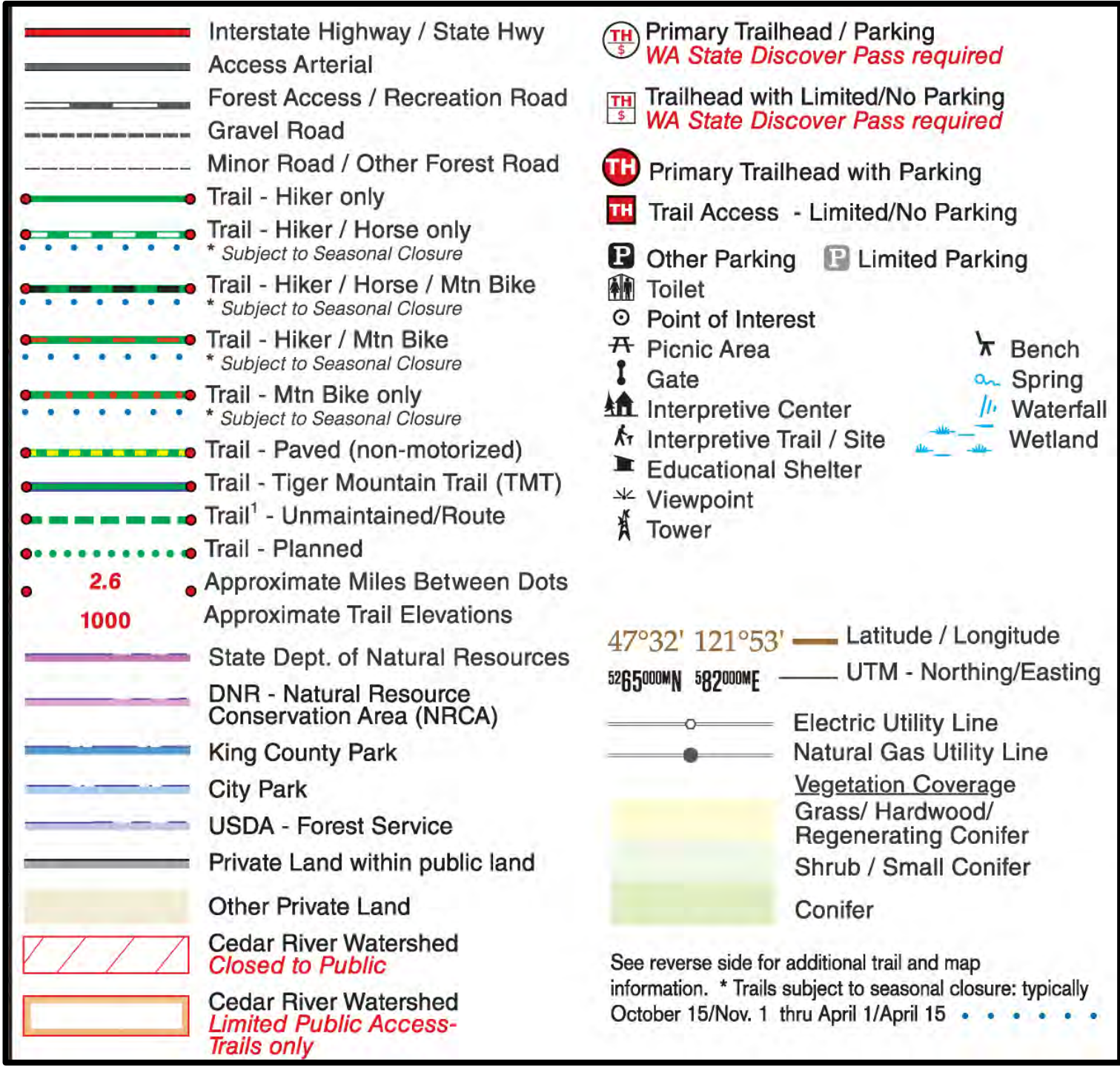
- Do your best to push through the pre-work and arrive at answers to the homework questions before the seminar – it will REALLY help you follow along during the seminar!!
 - We'll provide the answers during the online workshop on May 16!
- Don't worry if you can't quite figure out one of the concepts –you'll have time during the online workshop to talk through them!
 - *We'll also revisit all these concepts during the Staying Found field day.*
 - *You may also find it helpful to refer to these sections of the Wilderness Navigation textbook by Burns and Burns if you get stuck:*
 - Chapter 1, "Map Basics", pages 13-23
 - Chapter 2, "Compass Basics, pages 32-54
 - "How to Avoid Getting Lost", pages 80-88
 - "Slope Measurement on a Map", pages 109-112



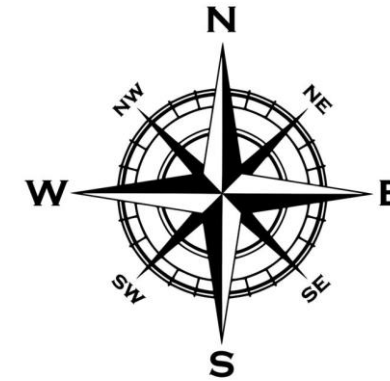
Green Trails 204S is the map we will be using in this course. Lay it out in front of you.

This homework is aimed at helping you get familiar with the map and features on the map, to make the concepts in the online lecture and field trip easier to follow.

We will focus on the upper left quarter of the map, as shown here.

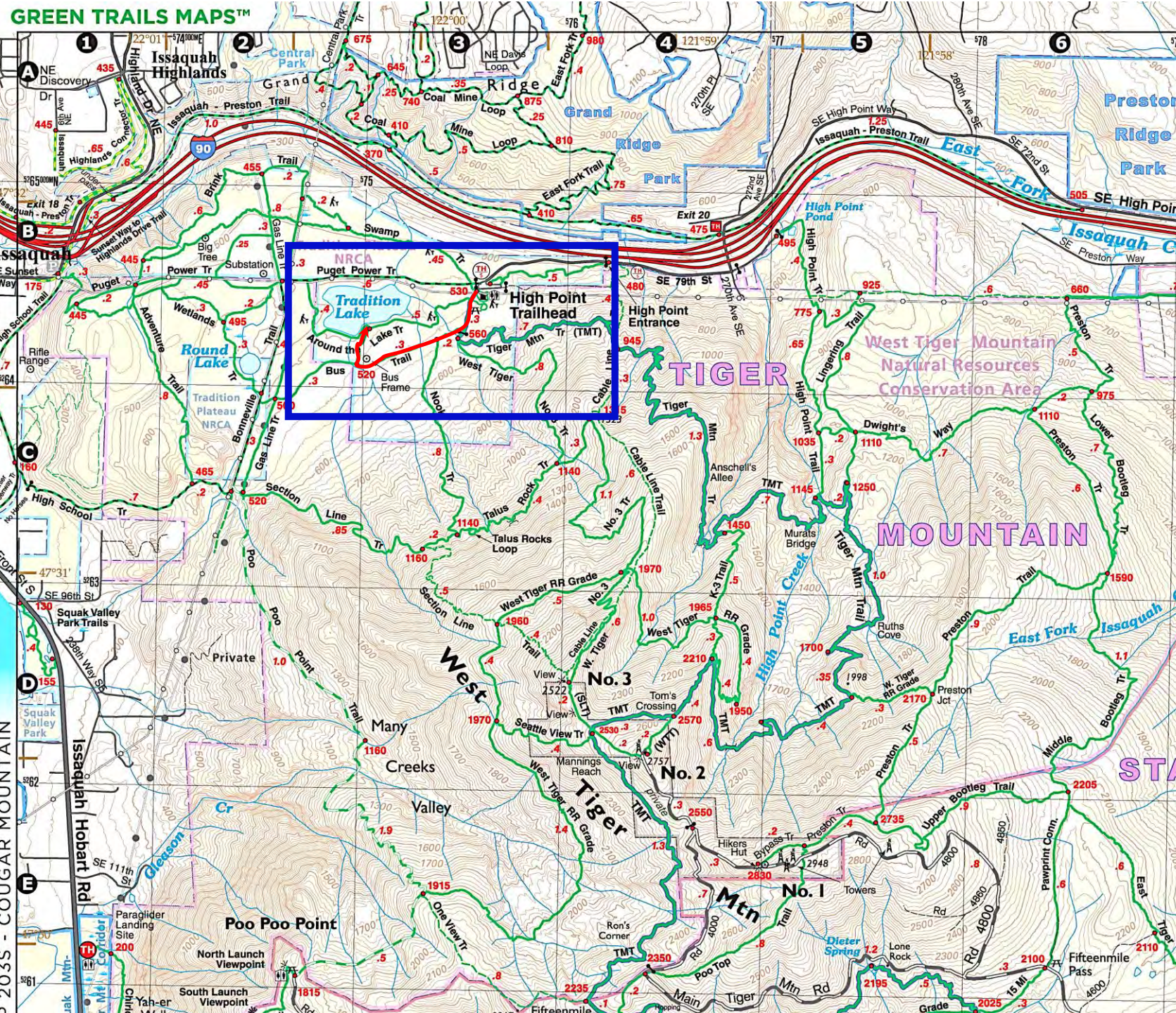


Map Legend



First, find the map legend and address the following in the upper left section of the map:

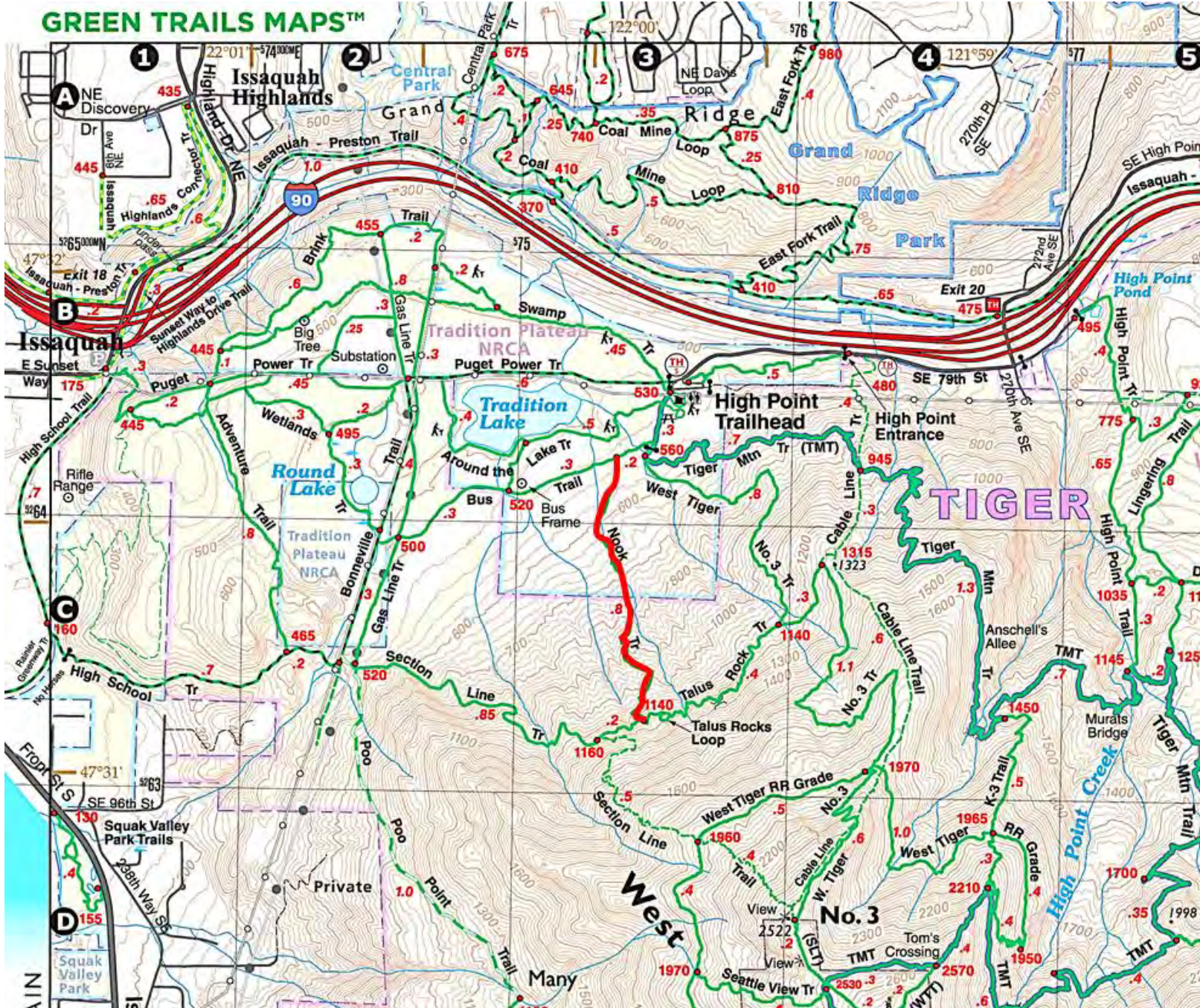
- What direction is North on the map? South, east, west?
- Find the High Point Trailhead education shelter
- Find interstate 90 and the access road you drive on to get to the trailhead
- Find a hiker-only trail, and an unmaintained trail
- Find a lake. Find a creek that crosses the Tiger Mountain Trail.
- Find a power line and a gas line.



Let's find the first hiking route that we'll be referring to in the seminar!

Trace the West Tiger 3 trail on your map as it leaves the education shelter; then turn onto the Bus Trail going west from the West Tiger 3 trail to the short spur that goes from the bus trail to the Around the Lake trail.

- Study the info on the map and note some features that you could watch for to help you (in case there isn't a sign) to:
 - (a) Find the turnoff from the Bus Trail to the Around the Lake trail.
 - (b) Tell if you've missed that turnoff.

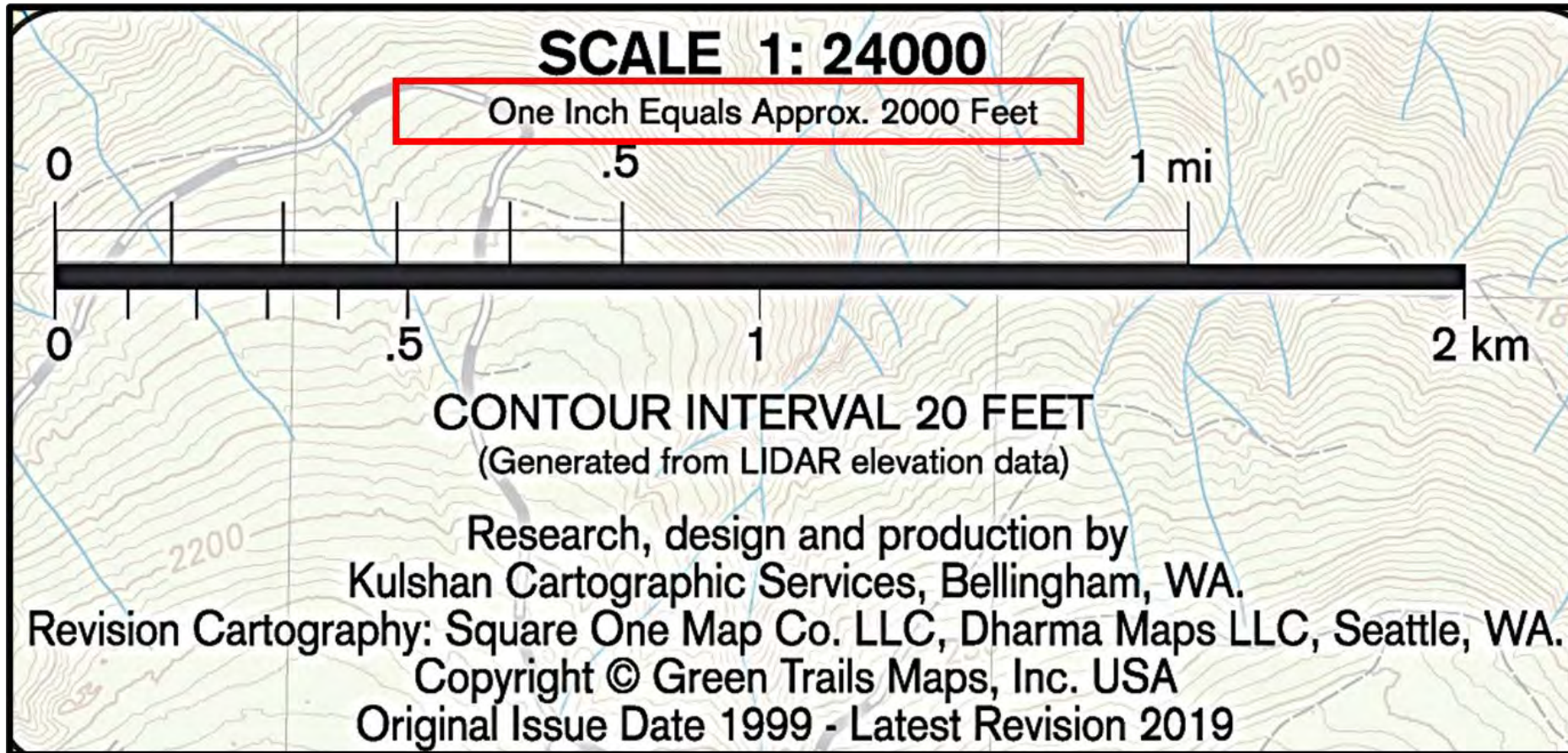


Now find and trace on your map the Nook Trail between the Bus trail and the Talus Rocks trail, as shown here.

Q1. What would be a good example of a map feature that parallels the Nook Trail? (A feature that parallels your trail and can be used to stay on track is called a 'handrail'.)

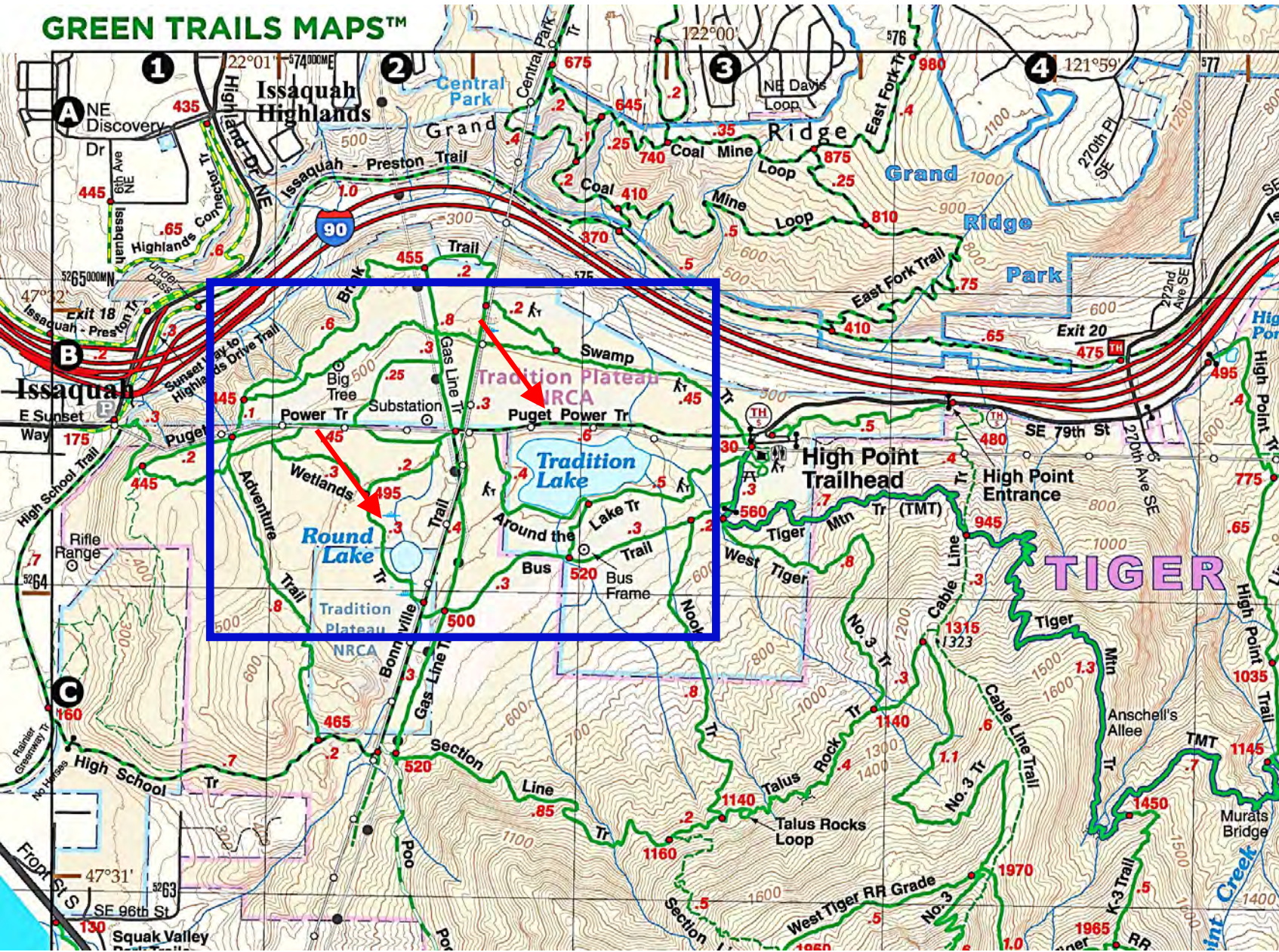
Now find the scale on your map.

Q2. What distance on the ground is represented by one inch on your map?



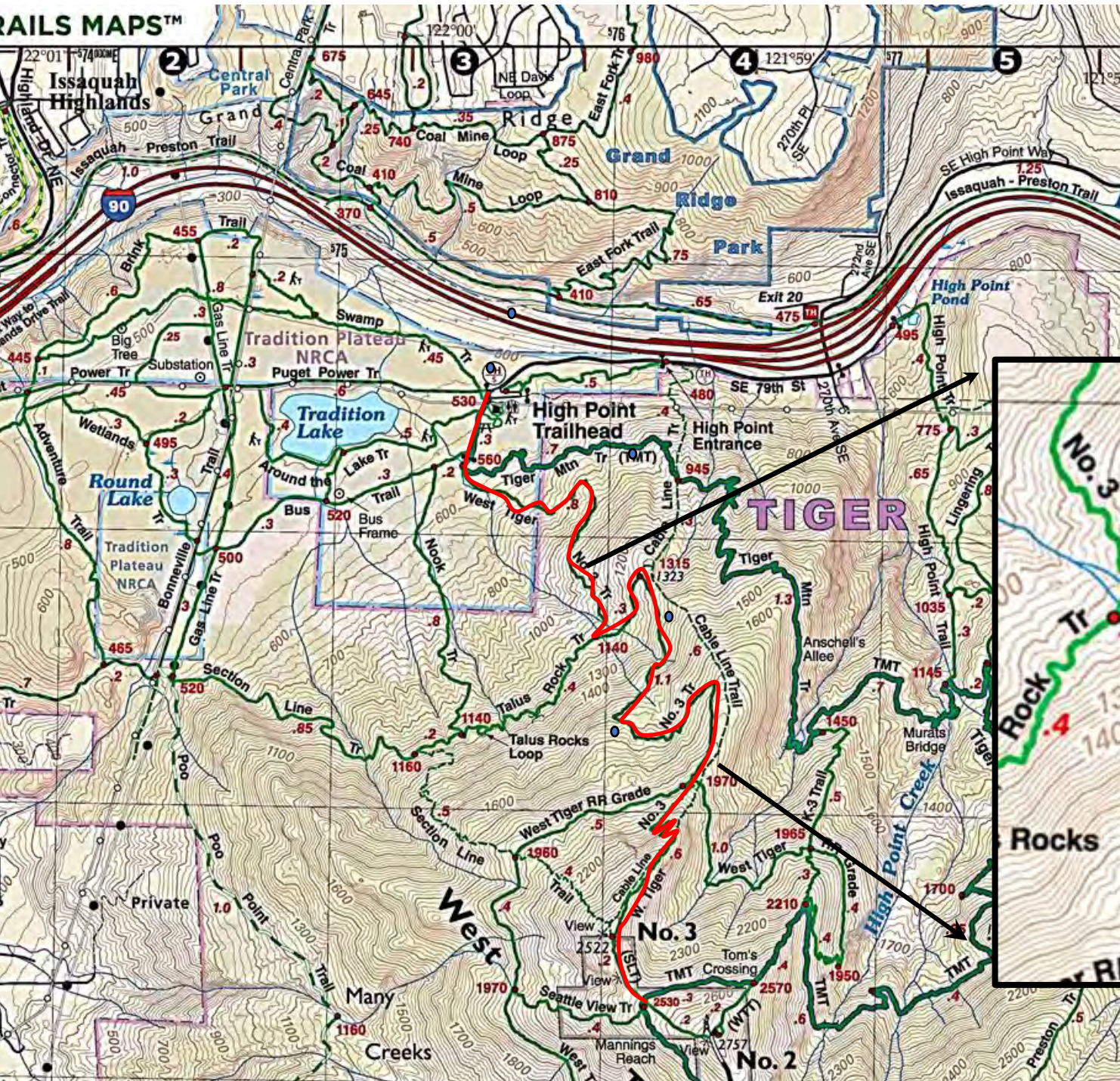
Note: Different maps can have very different scales!

Interpreting the Map Scale



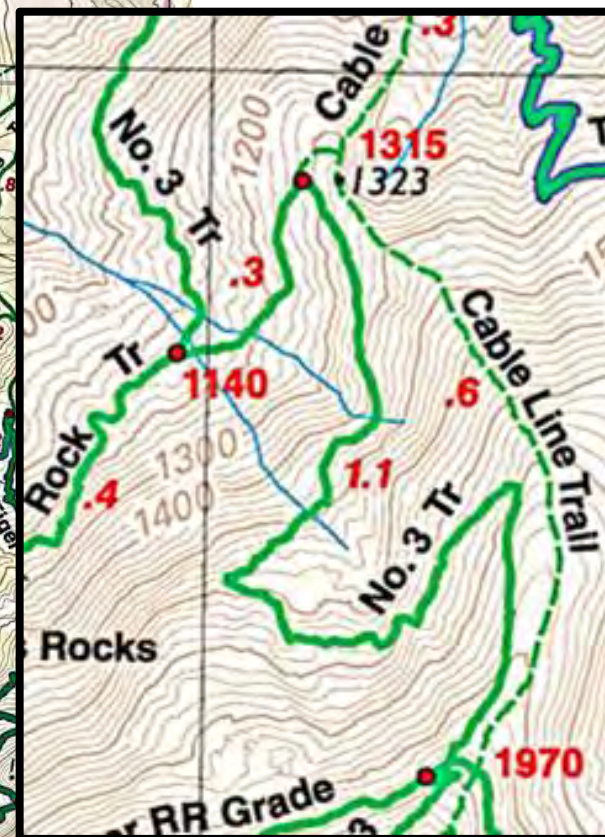
Q3. Using your paper map and the scale information we've just reviewed, what is the straight line distance in feet between Round Lake and Tradition Lake?

Hint: Measure the map distance in inches and convert to feet according to the map scale.



On your map, find and trace the West Tiger Mountain #3 trail to the junction of the Tiger Mountain Trail, just beyond the West Tiger #3 summit as shown.

Find the red dots on your map marking sections of trail, and the red numbers indicating the miles between each pair of red dots.



Q4. What is the trail distance between the dot marked 1140 and the dot marked 1970 in this enlarged map section?

Now let's find some contour lines on your map and learn how to decipher them.

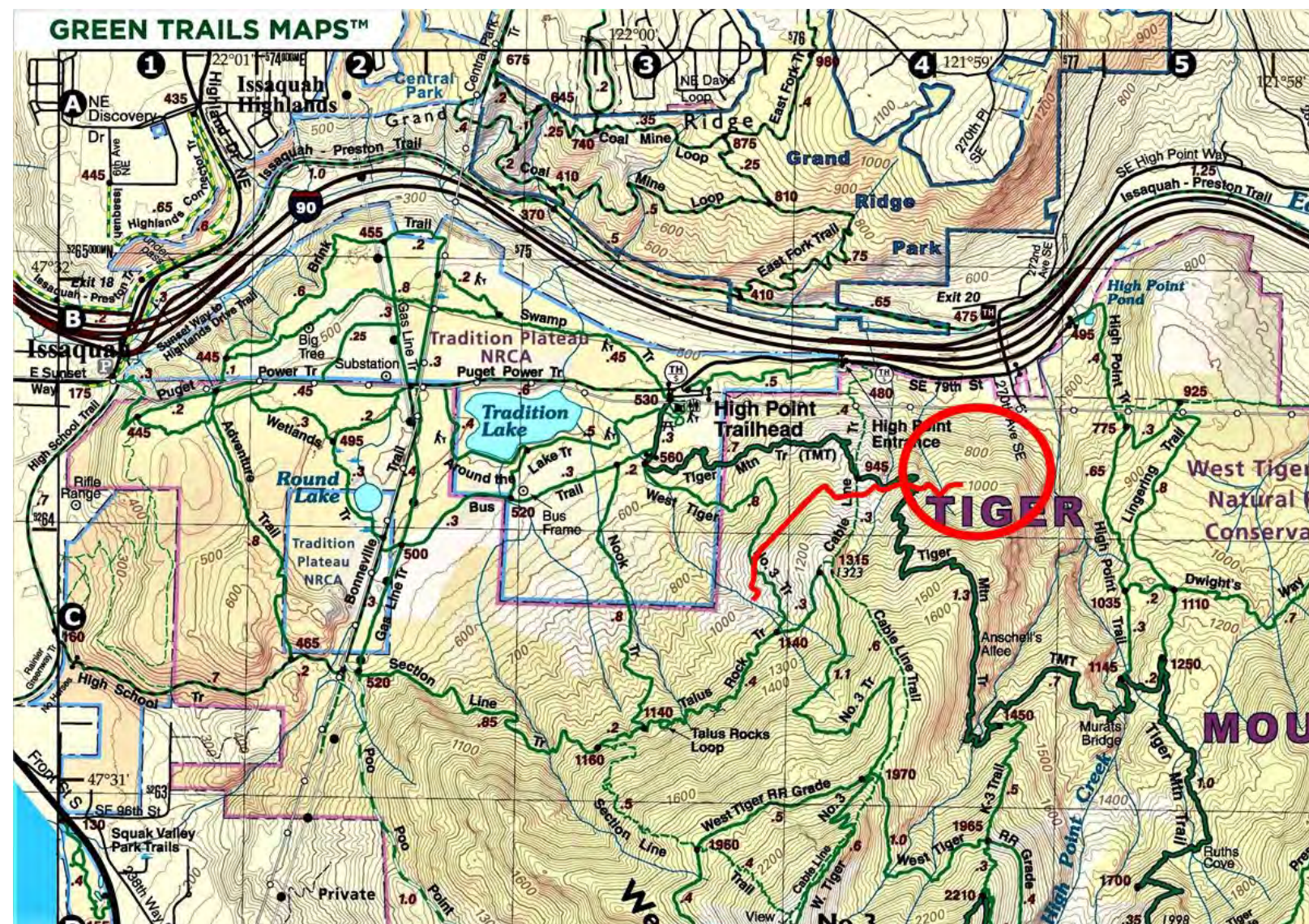


On your map, find the words 'High Point Entrance' and study the brown wavy lines just below and to the right of those words. These are "contour lines".

Notice that there are darker and fainter contour lines. The darker contour lines are called 'Index Contours'.

A number is printed on some of the Index Contours. This is the elevation of any point along that line!

1.C. Find and decipher the contour lines on your map to determine your elevation and important terrain information .



Trace the 1000' contour around to the west as shown until it intersects the Tiger Mountain Trail (TMT), and on to the junction with the West Tiger 3 trail.

What will be your elevation at those points on the two trails?

Deciphering contour lines (continued)



Find two Index Contours on either side of the 1000' contour you just traced. (Not all index contours will have a number on them so you might have to interpolate.)

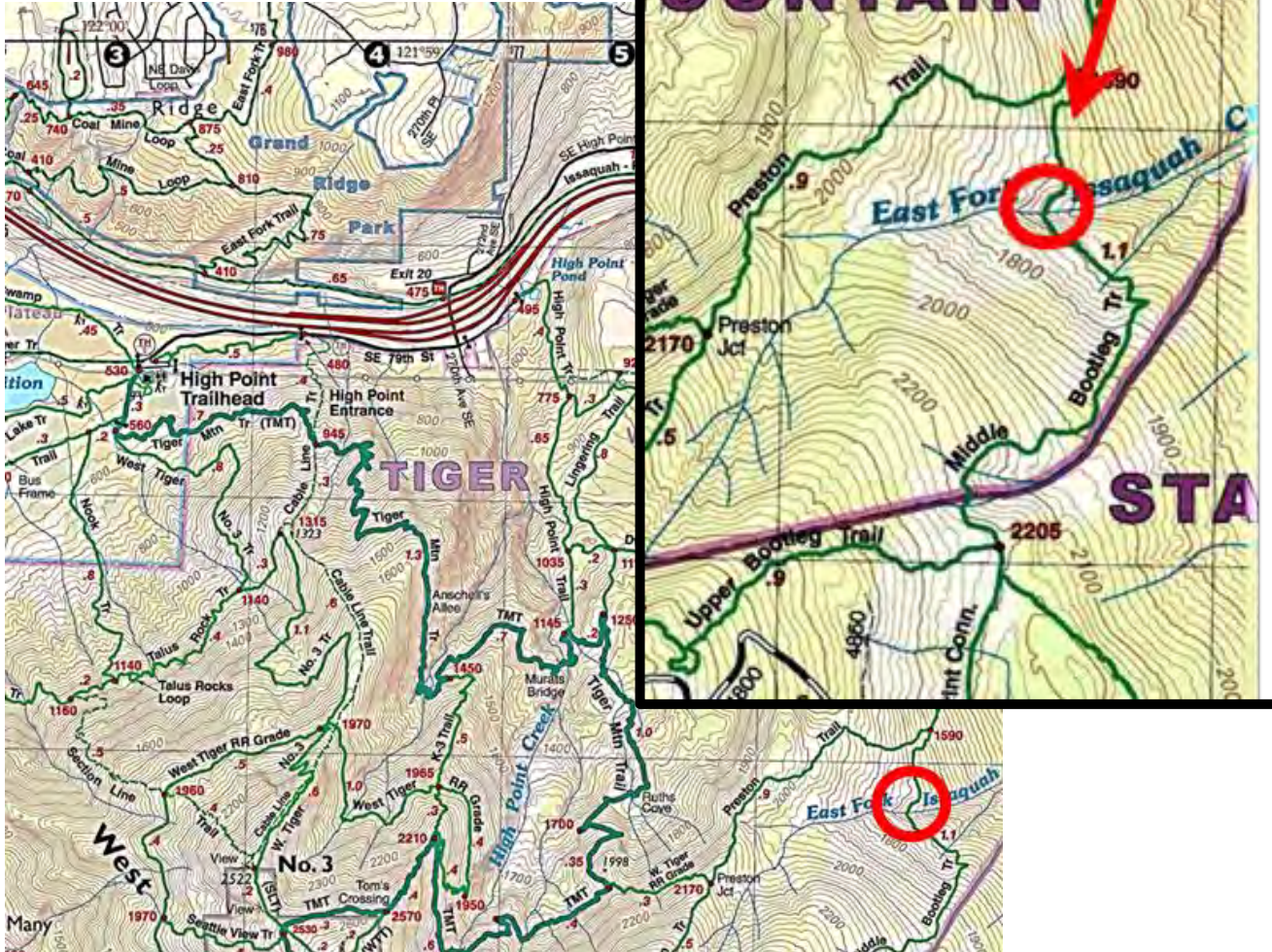
Recalling that those numbers represent the elevation in feet, see if you can answer the following:

Q5. How many feet are between each Index Contour on your map? (Hint: subtract the smaller from the larger elevations of two adjacent Index Contours.)

Q6. Count the number of fainter contour lines between two adjacent Index Contours. How many feet of elevation are there between each of these contour lines? *This is called the Contour Interval.*

Cross-check: Now go back to the scale on your class map. Does the contour interval on the scale match what you just calculated?

Estimate the elevation at any point on the map using contours



Find the point on your map where the East Fork Issaquah Creek crosses the Middle Bootleg Trail as shown.

Q7. What is the approximate elevation at the point circled on the map?

Hint: Remember the contour interval that you just calculated. That tells you number of feet between the fainter contour lines!

Count the number of contours up or down to the circled spot on the trail from the nearest index contour, and multiply by the contour interval.

Remember that you have a magnifier on your compass!

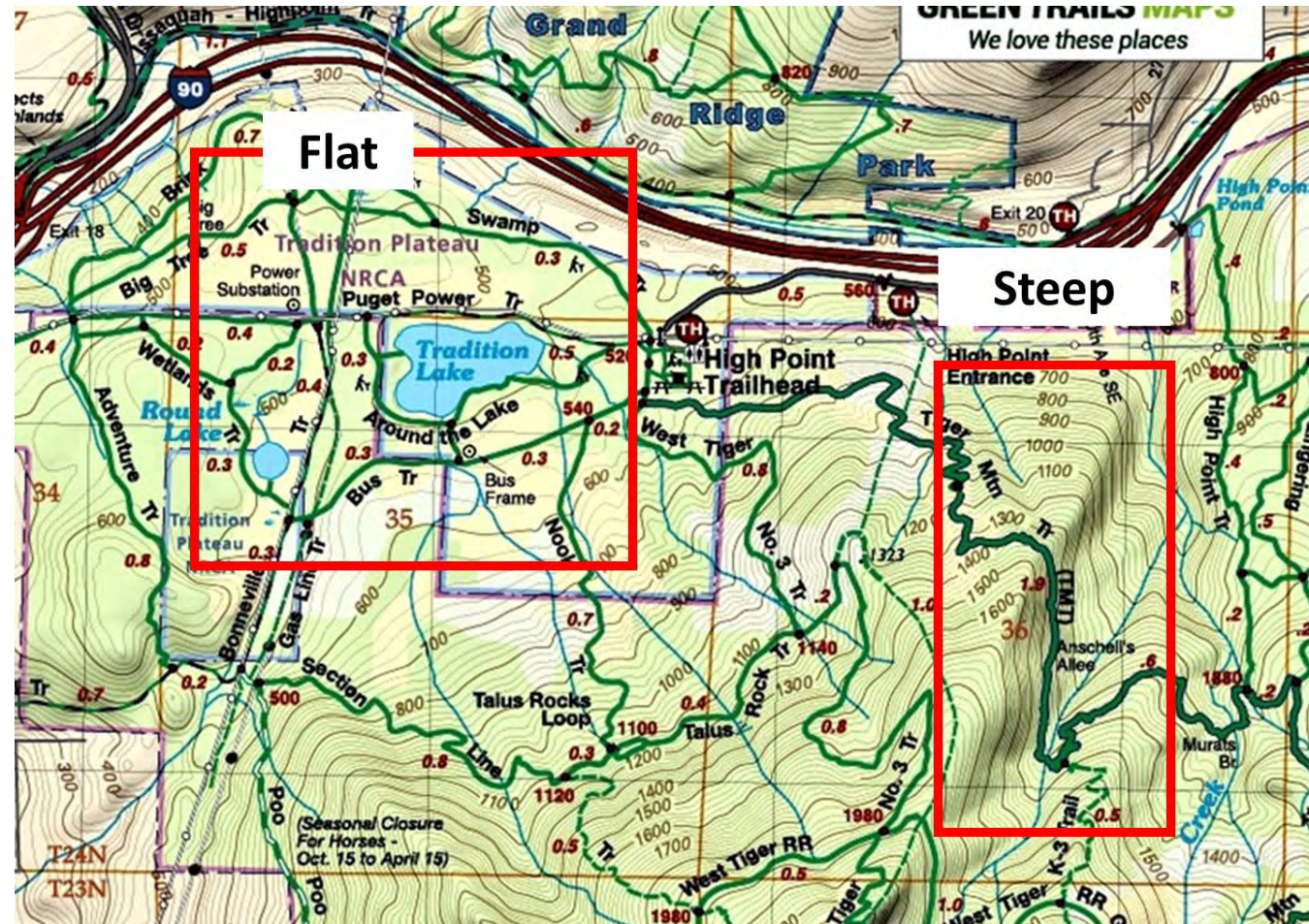
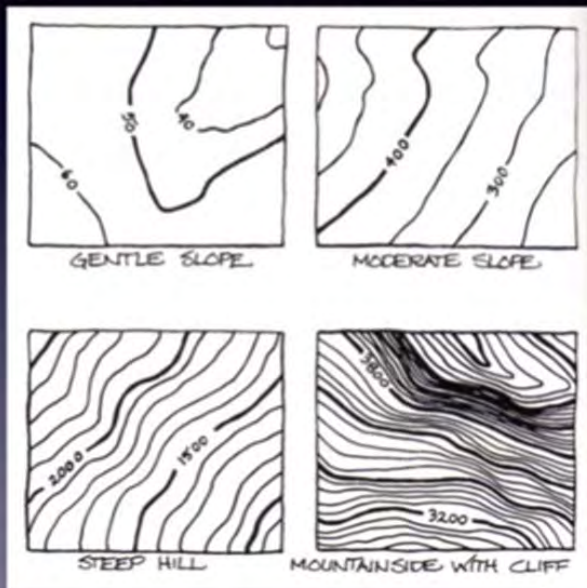
Understand the terrain you can expect by studying contour lines on your map

Here are two flat and steep areas on your Tiger Mountain map. Look on the map for some others.

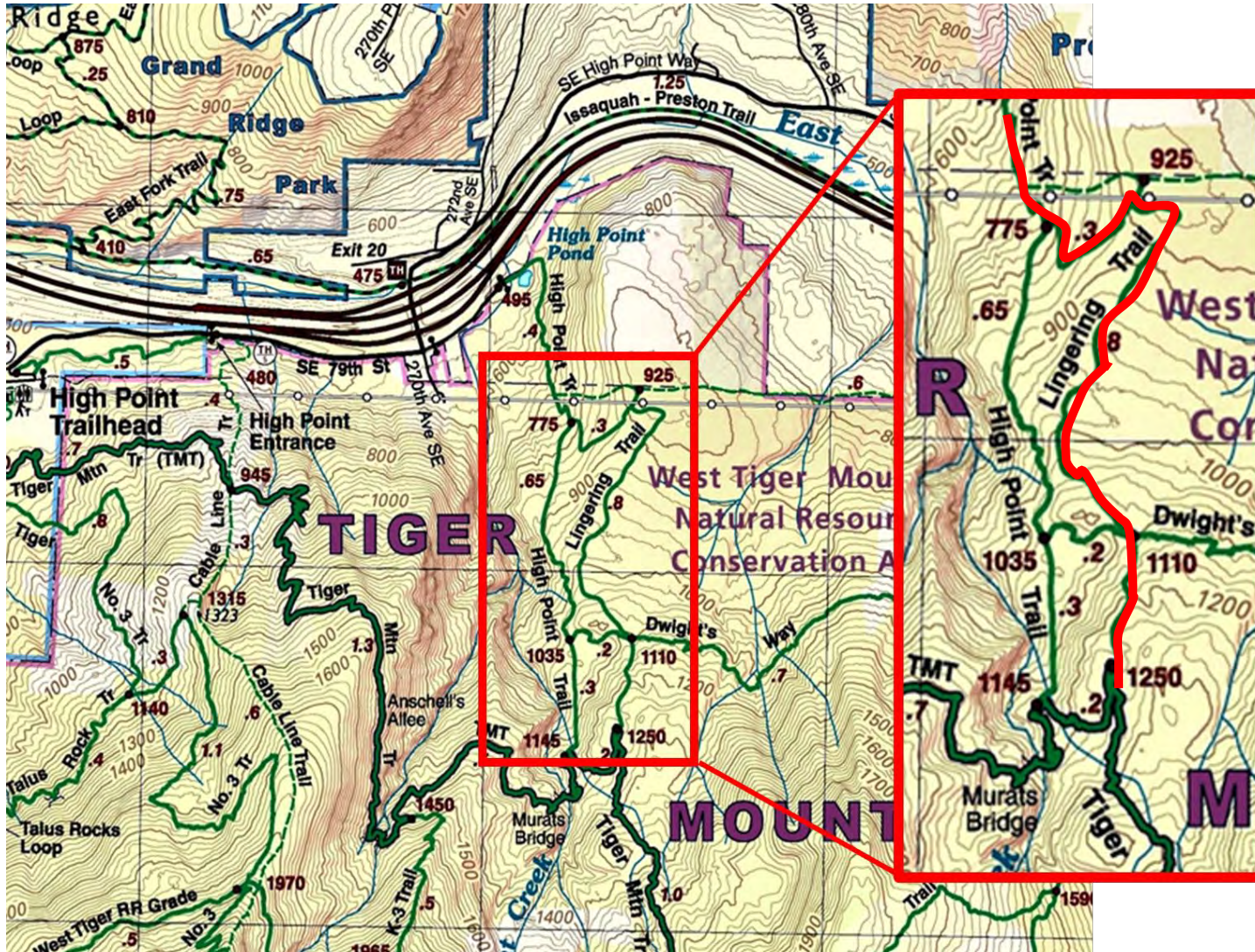
Flat or Steep?

Contour rule 1:

The closer together the contour lines, the steeper the terrain.



Understand the terrain you can expect by studying contour lines on your map



Just east of the High Point trailhead, trace the Linger Trail on your map as it goes south from the High Point Pond.

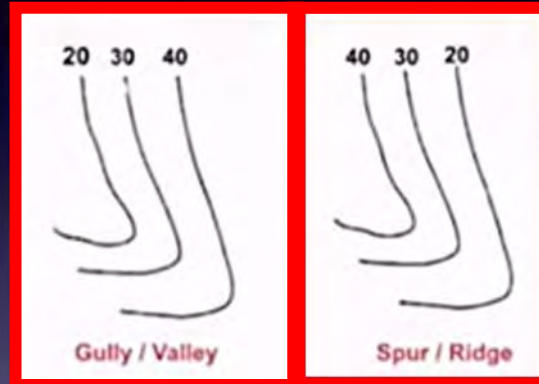
Q8. Based on how close together the contour lines are as you travel along the trail, describe how the steepness of the trail will change as you walk between the points marked 925 and 1110.

This kind of 'situational awareness can be very helpful to you in figuring out where you are on the trail!

Understand the terrain you can expect by studying contour lines on your map

Gully or Spur?

Gullies and spurs look a lot alike!
But, it's easy to tell them apart.

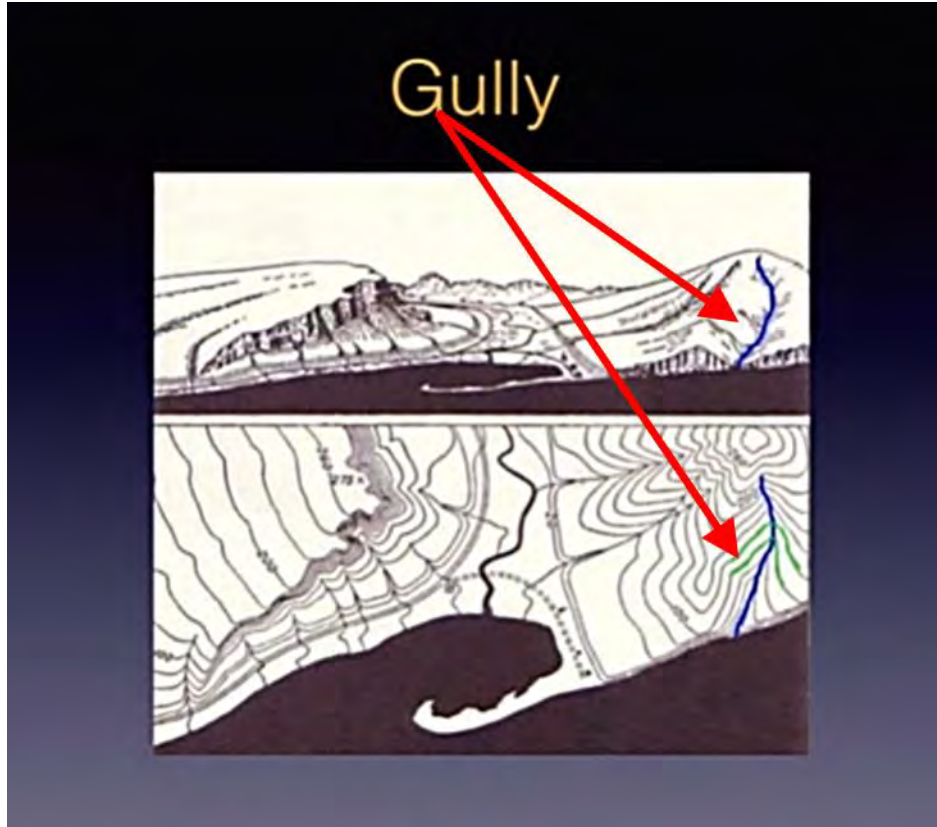


“Ridges roll down and gullies go up!”

Contour Rule #2: When crossing a gully or creek, contours always bend uphill.

Contour Rule #3: When crossing a spur or ridge, contours always bend downhill.

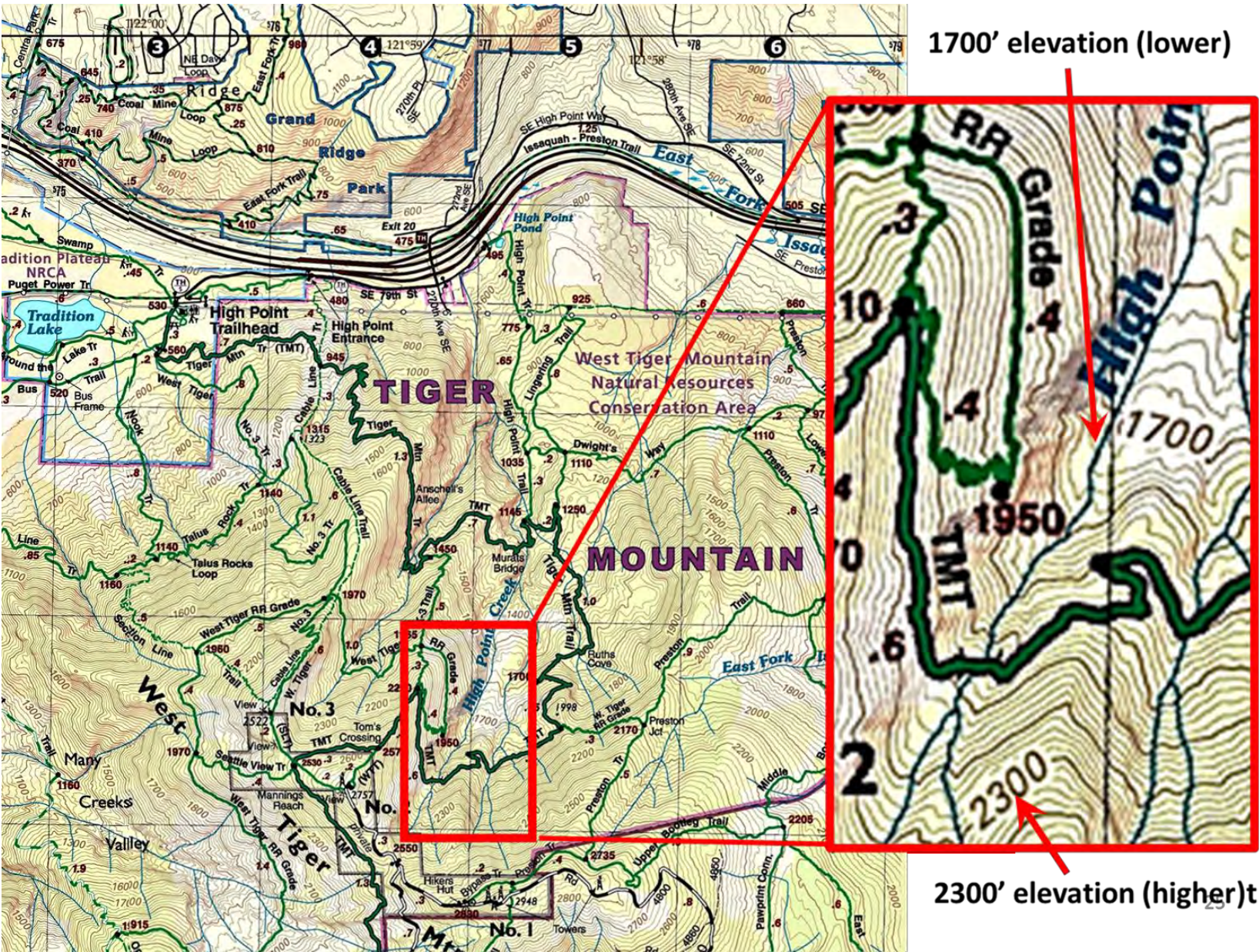
Gullies or valleys



Creeks or rivers are usually great giveaways for the location of a gully or valley. The direction of flow (always downhill!) indicates what direction is uphill and downhill.

See in the lower drawing how the contours curve uphill.

Gullies or Valleys



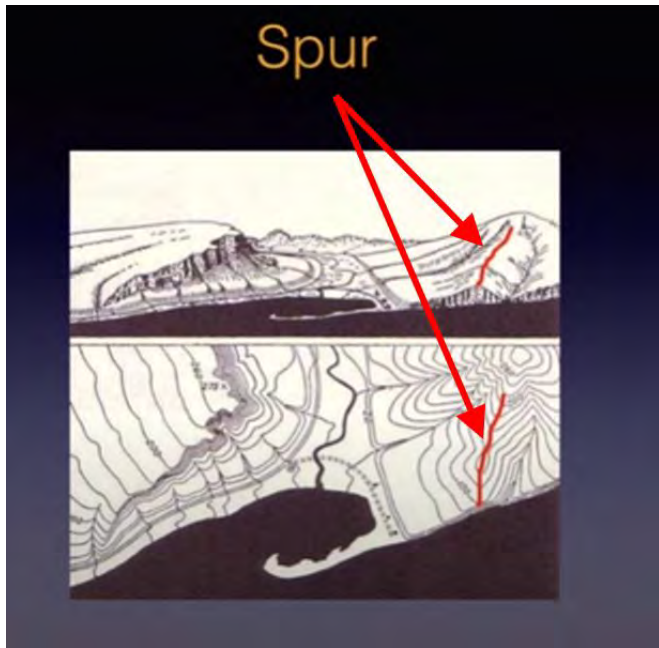
Find the marked portion of High Point Creek on your map, and examine the elevation contours along the selected portion of the creek.

Q9. Which direction is downhill along High Point Creek? (such as 'goes downhill toward the lower right of the marked square') . **What does this tell you – is this a gully/valley or not?**

HINT: Remember that the contours bend or “V” in the uphill direction if you are looking at a gully or valley.

1.C. Using contour lines - continued

- Now lets review how to recognize spurs (ridges) on a topo map.



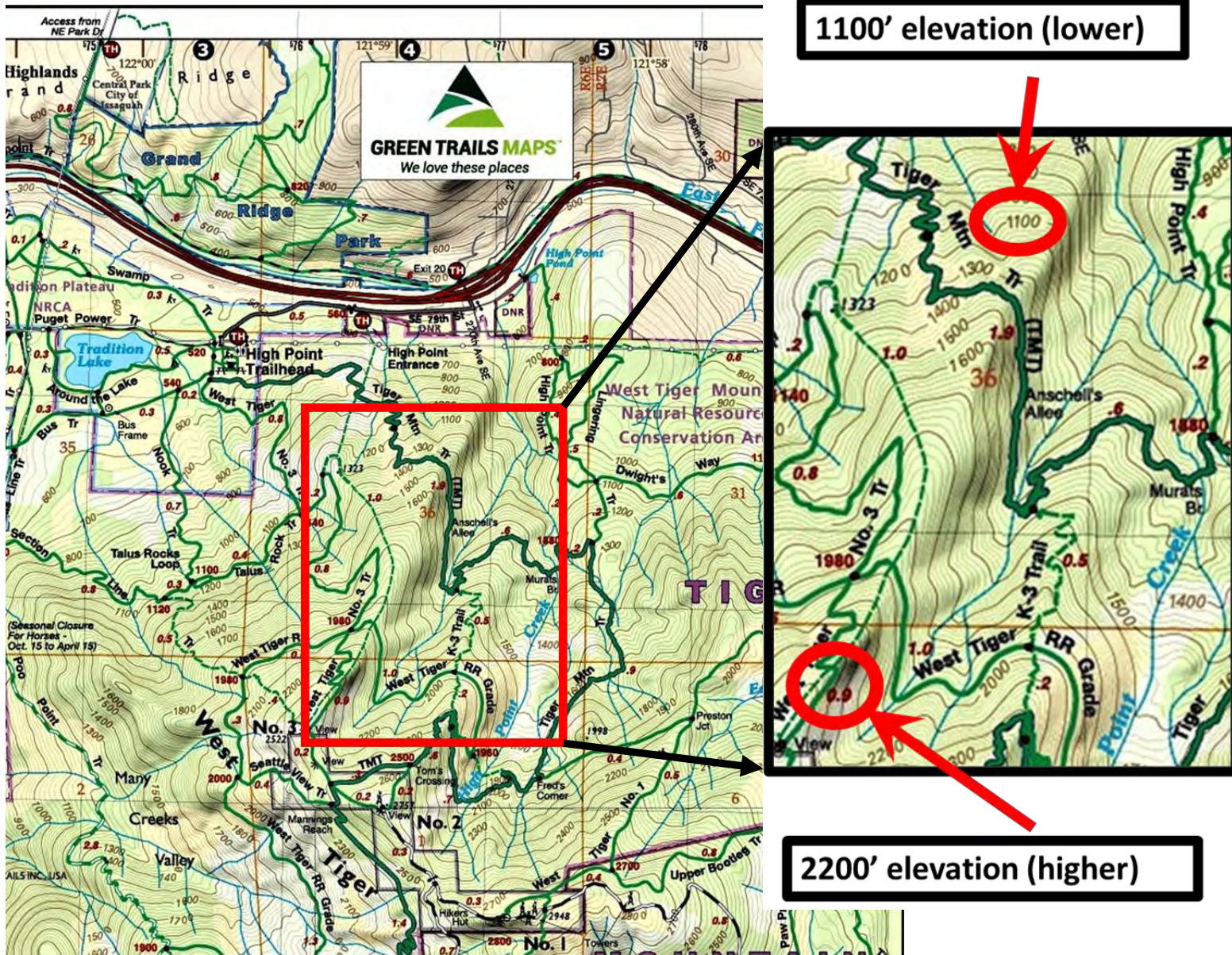
First use the elevations marked on the Index Contours to determine which way is uphill and which way is downhill.



Which direction do the contours curve in these drawings?

➔ They curve downhill. These are ridges or spurs.

Gully or Ridge/Spur?



Find this section of the Tiger Mountain Trail on your paper map.

Look closer at the shaded area going from the lower left to the upper right of the square. This indicates a terrain feature along the left of the shaded area.

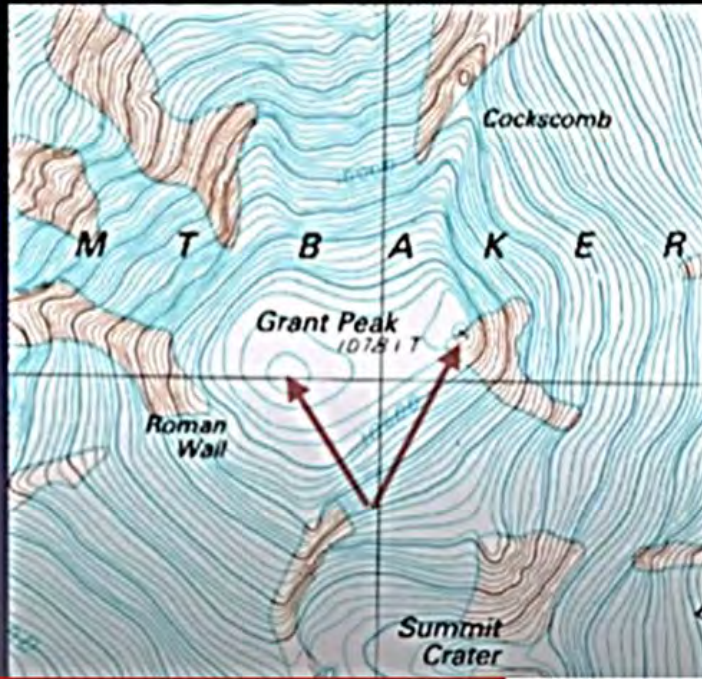
Q10. Based on the elevations along this feature and the shape of the contours along it, is this a ridge or a gully?

- Hint: Remember that “ridges roll down and gullies go up!”

Understand the terrain you can expect by studying contour lines on your map

Peak or Summit

- The widely spaced contours show a fairly flat summit plateau, with twin high points.
- The actual summit usually has a printed elevation.



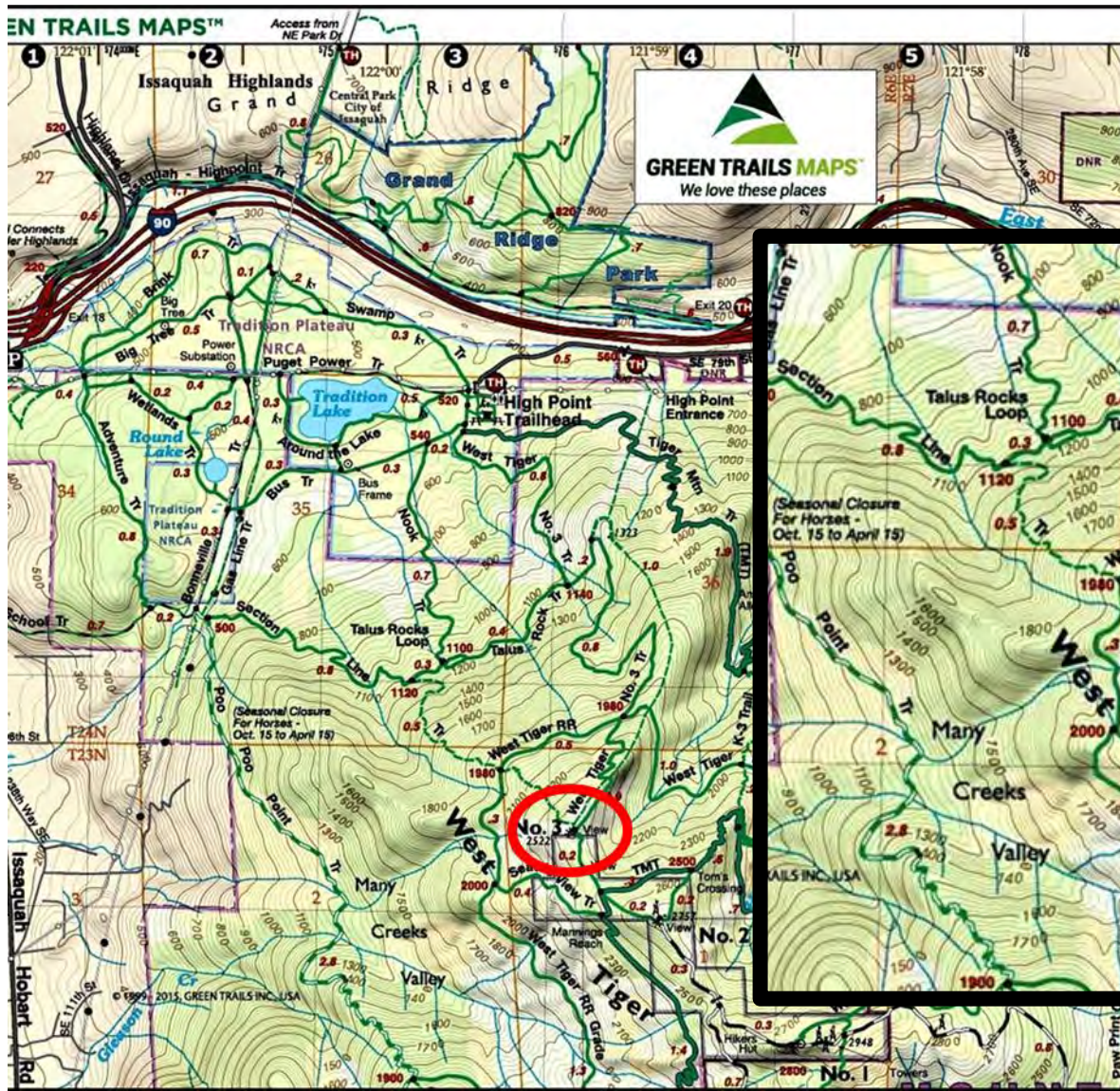
Knoll (Hill)



On your Tiger Mountain map, find examples of a summit or peak (usually has an elevation printed next to them) and a knoll or hill.

Understand the terrain you can expect by studying contour lines on your map

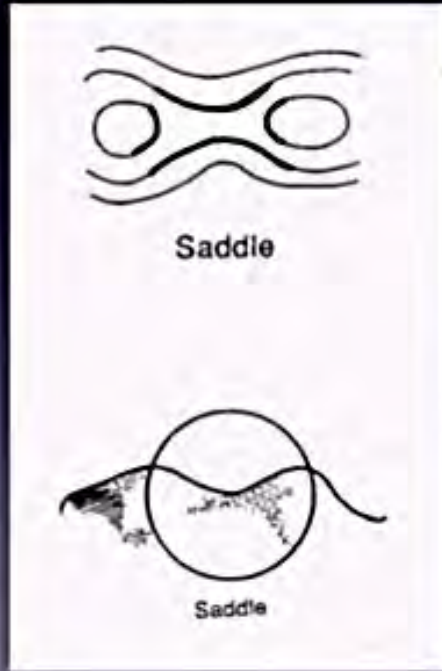
Locate the peak labeled No.3 on your map (West Tiger 3) .



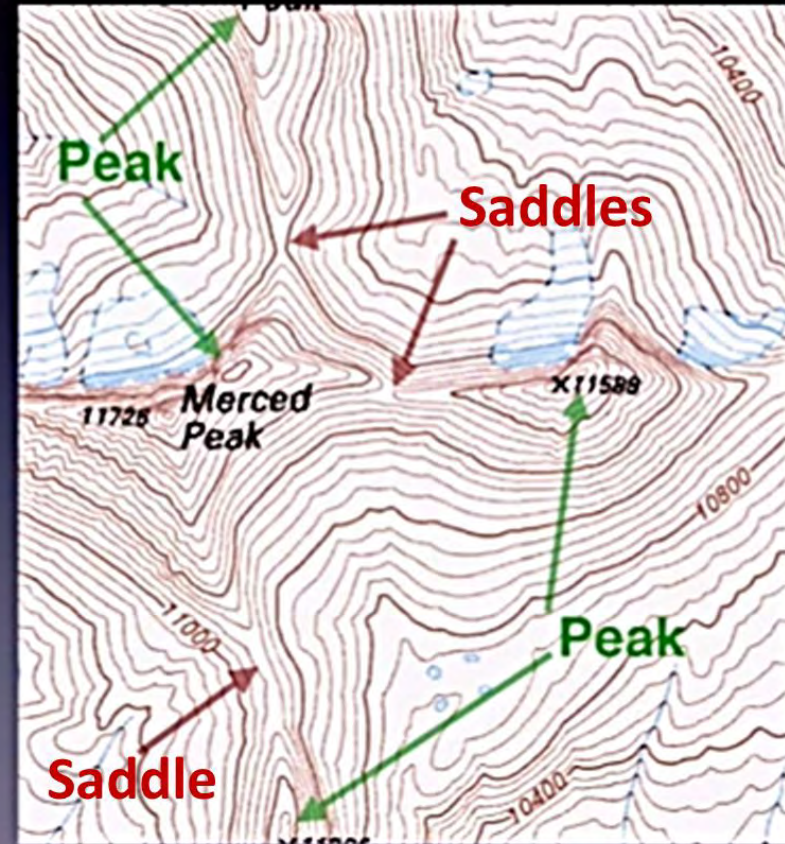
Trace along two ridges and two gullies that drop from that peak.

Understand the terrain you can expect by studying contour lines on your map

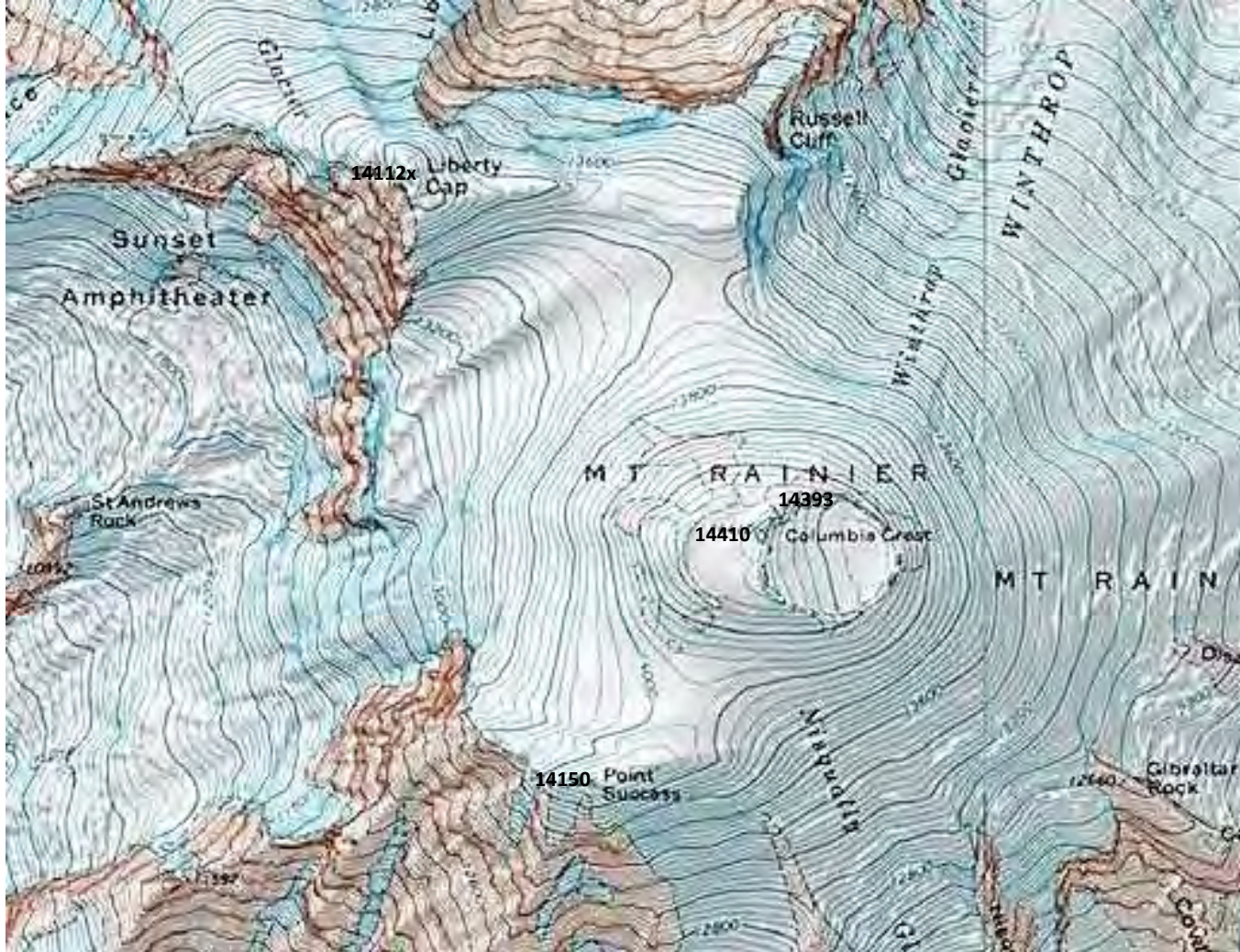
Saddles



Saddles

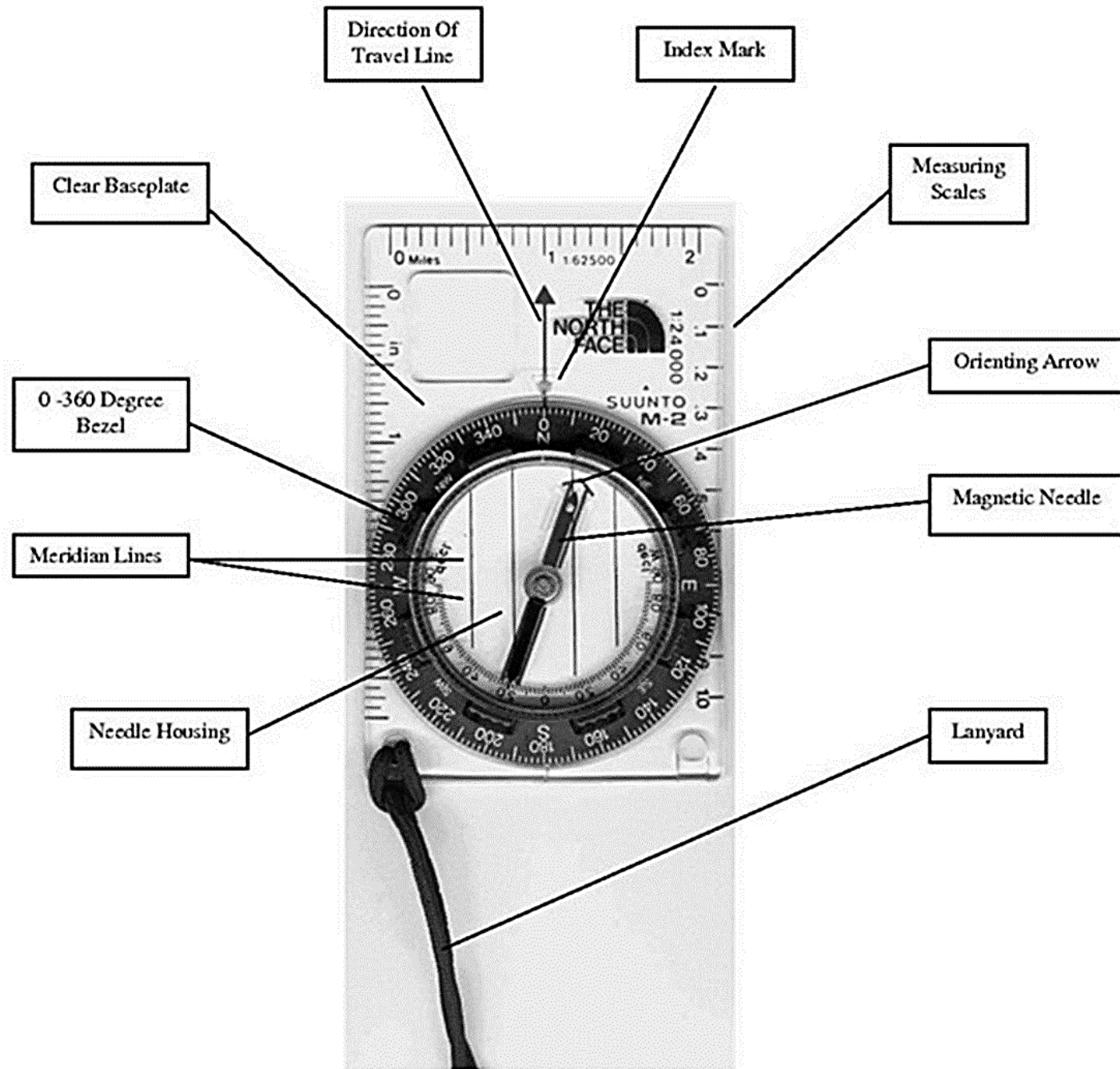


Understand the terrain you can expect by studying contour lines on your map



Let's use this topographic map of Mount Rainier to practice finding summits and saddles:

- **Q11. Circle the main summit and a secondary summit. What are the elevations of the two summits?**
- **Q12. Is the terrain flat or steep immediately around the main summit?**
- **Q13. Find two saddles near the summit and estimate their elevations.**



Compass Parts and Functions

Get out your compass and find the main parts that match this diagram.

(Be sure that the declination is set to 15 degrees east on your compass before you do this exercise. The magnetic needle and orienting arrow compared to the N on the compass bezel should look similar to the picture shown here. Watch [this video](#) to learn how to set your declination.)

Orienting your map to north

When you and your map are facing north, the direction of trails and landmarks on the ground is the same as their direction from you on the map. This makes it easier to figure out which way you should go on the ground.

Now let's practice!

1. Set the bezel on your compass so that the N for north is lined up with the index mark.
2. Stand up and line up the straight-edge of your compass along the margin of your Green Trails map and, holding map and compass square to your body, move your feet to turn your body and the map until "red is in the shed".
 - *Now your map – and you! - are oriented to north so the direction to landmarks on the ground and on the map are the same.*

What is the bearing along the direction-of-travel arrow on your compass? (this is the direction that you and your map are facing)

2.B. Orienting your map to north (continued)

Now let's practice!

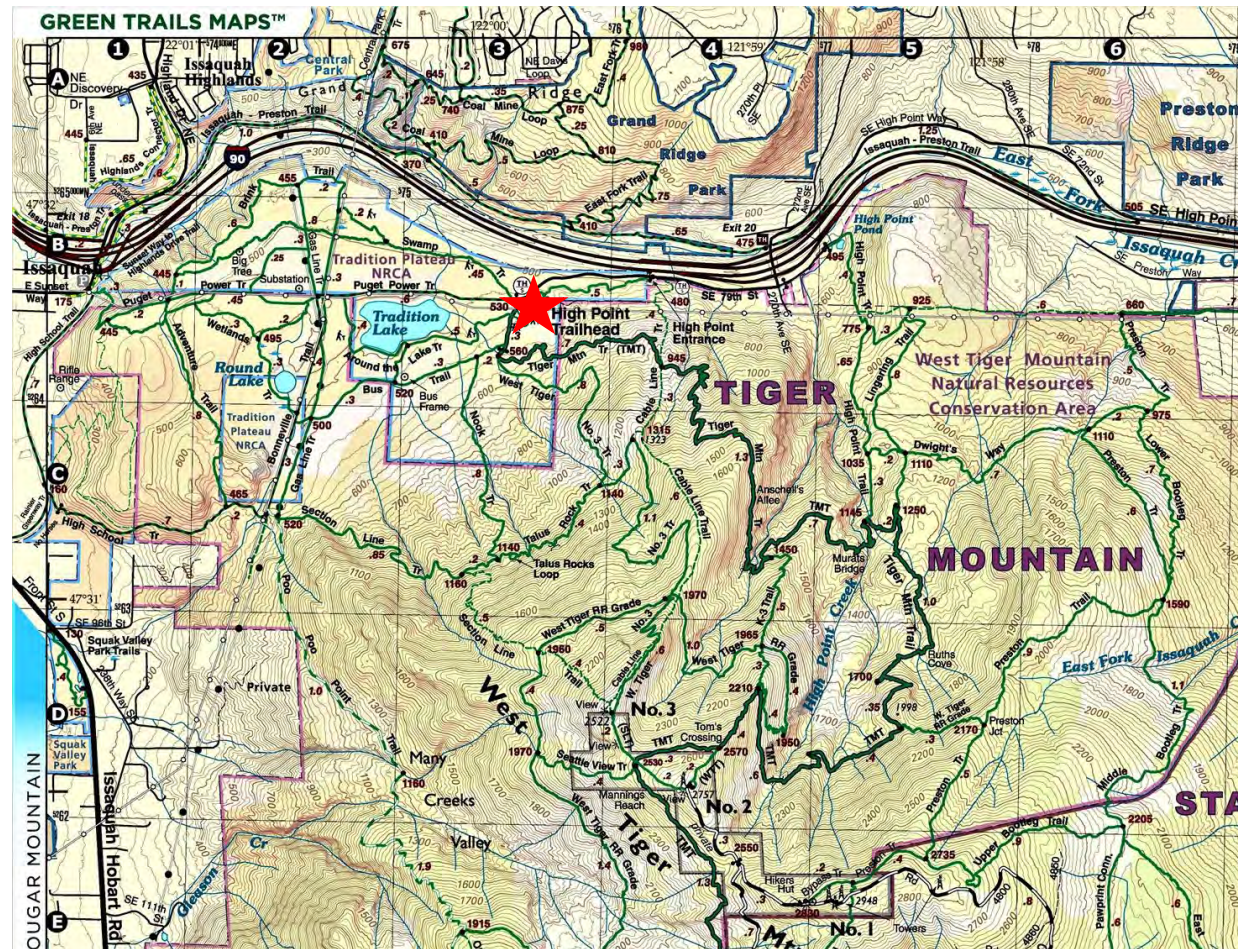
1. Set the bezel on your compass so that the N for north is lined up with the index mark.
2. Stand up and line up the straight-edge of your compass along the margin of your Green Trails map and, holding map and compass square to your body, move your feet to turn your body and the map until “red is in the shed”.
➤ *Now your map – and you! - are oriented to north so the direction to landmarks on the ground and on the map are the same.*

*What is the bearing along the direction-of-travel arrow on your compass?
(this is the direction that you and your map are facing) Don't worry, it's not a trick question!*

Orient your map to north (continued)

Keep standing with your body and your map oriented to north.

Now pretend that you are standing at the TH mark at the High Point Trailhead (red star).





Pretending to stand at the star facing north, and looking at your map:

- Point in the direction around you where Tradition Lake should be.
- Point in the direction around you where West Tiger 2 should be.
- Point in the direction around you that the West Tiger 3 Trail should go from your current location.

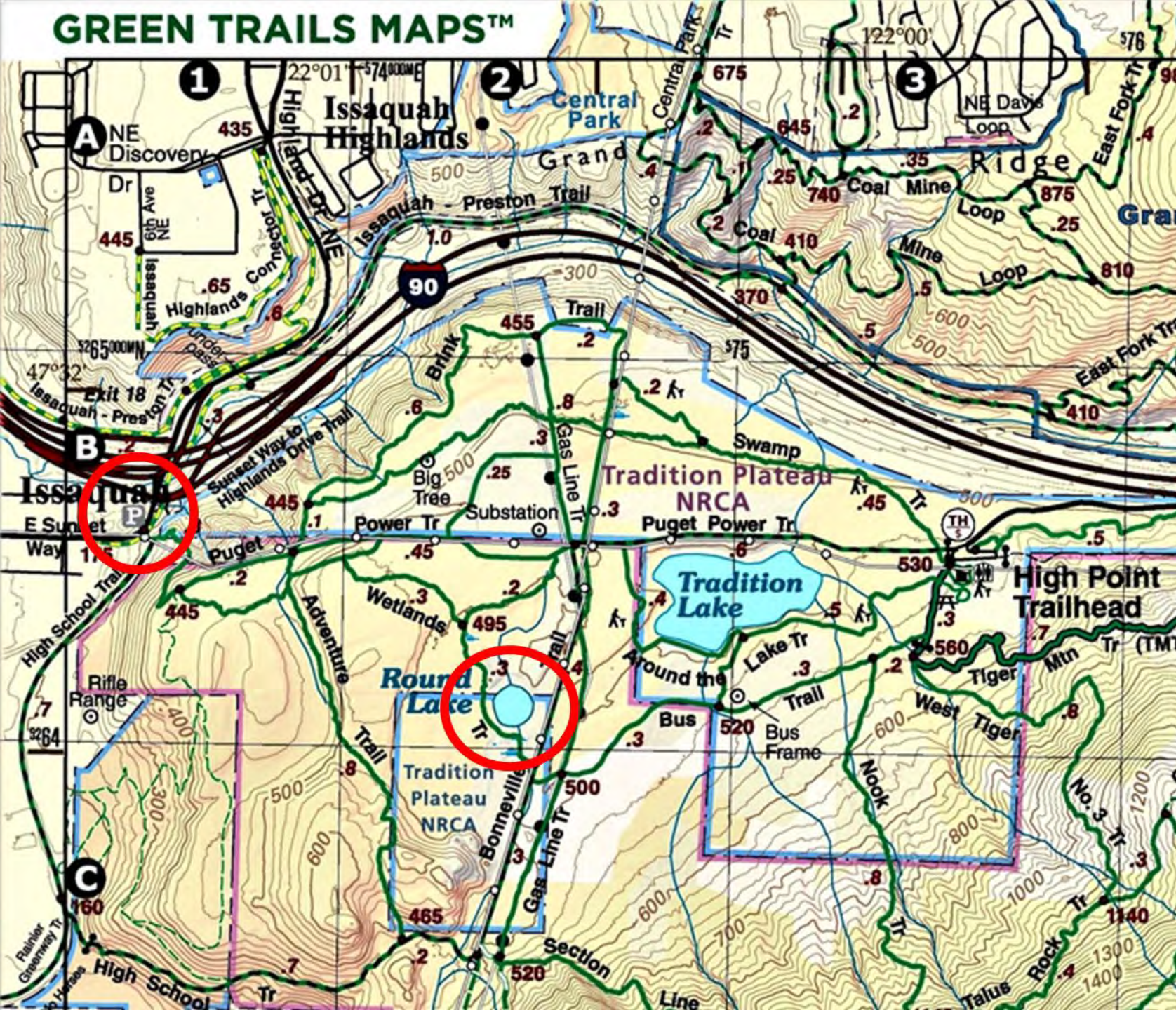
Now let's learn how to measure a bearing "in the field"

Face an object you can see from your current position. Hold your compass flat in front of you, and turn the bezel until the red magnetic needle is inside the orienting arrow.

What is the bearing (the number you read on the bezel) at the index mark?

That bearing is the direction that the object is from your position, as expressed in the degrees of angle from north.





Now let's measure a bearing on the map

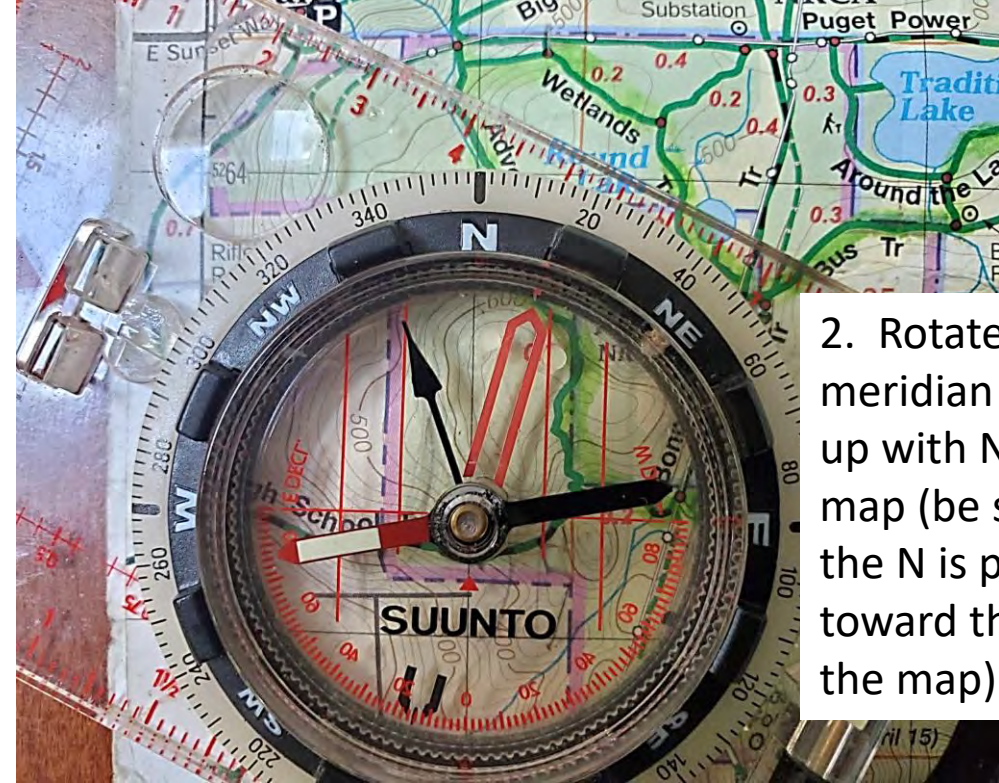
Now pretend we are at the East Sunset Way parking lot and want to walk to Round Lake but there are no trails. Find these two spots on your Green Trails paper map (we've given you some help here!).

The next page shows you how to use your compass to measure the bearing on your map from the parking lot directly across to the lake.

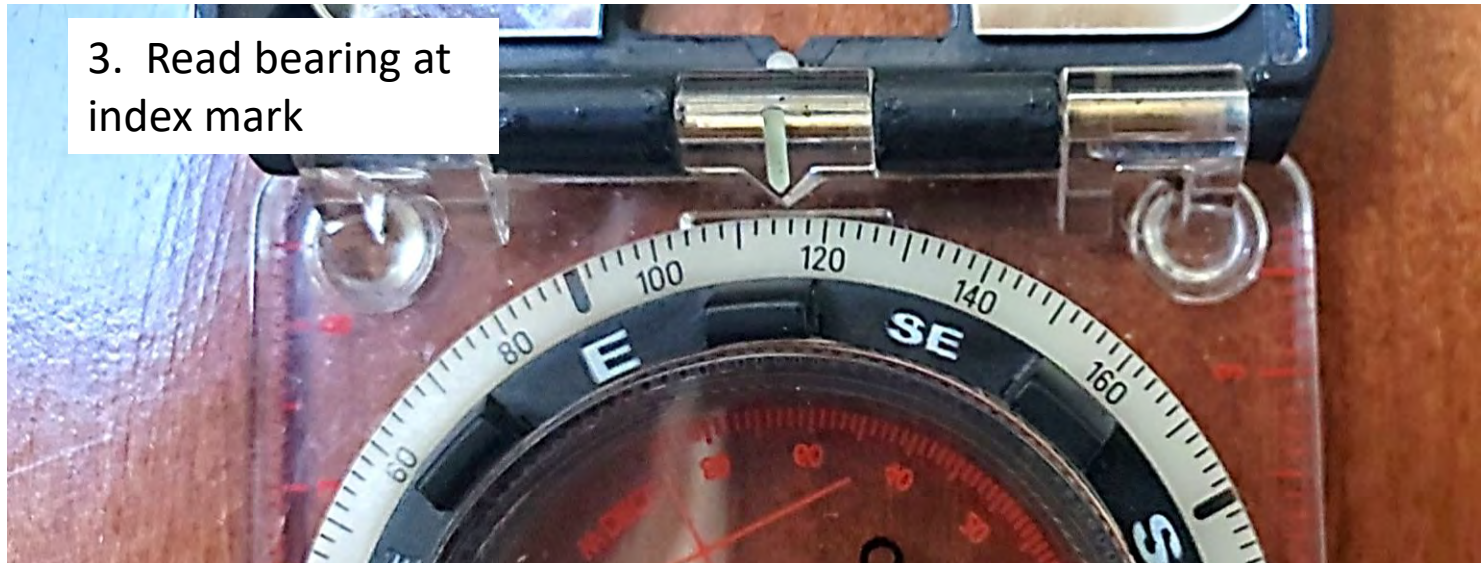
1. Line up compass straightedge between origin and destination, with the Direction of Travel arrow pointing toward where you want to go (Round Lake)



2. Rotate bezel so meridian lines line up with N-S lines on map (be sure that the N is pointing toward the top of the map)



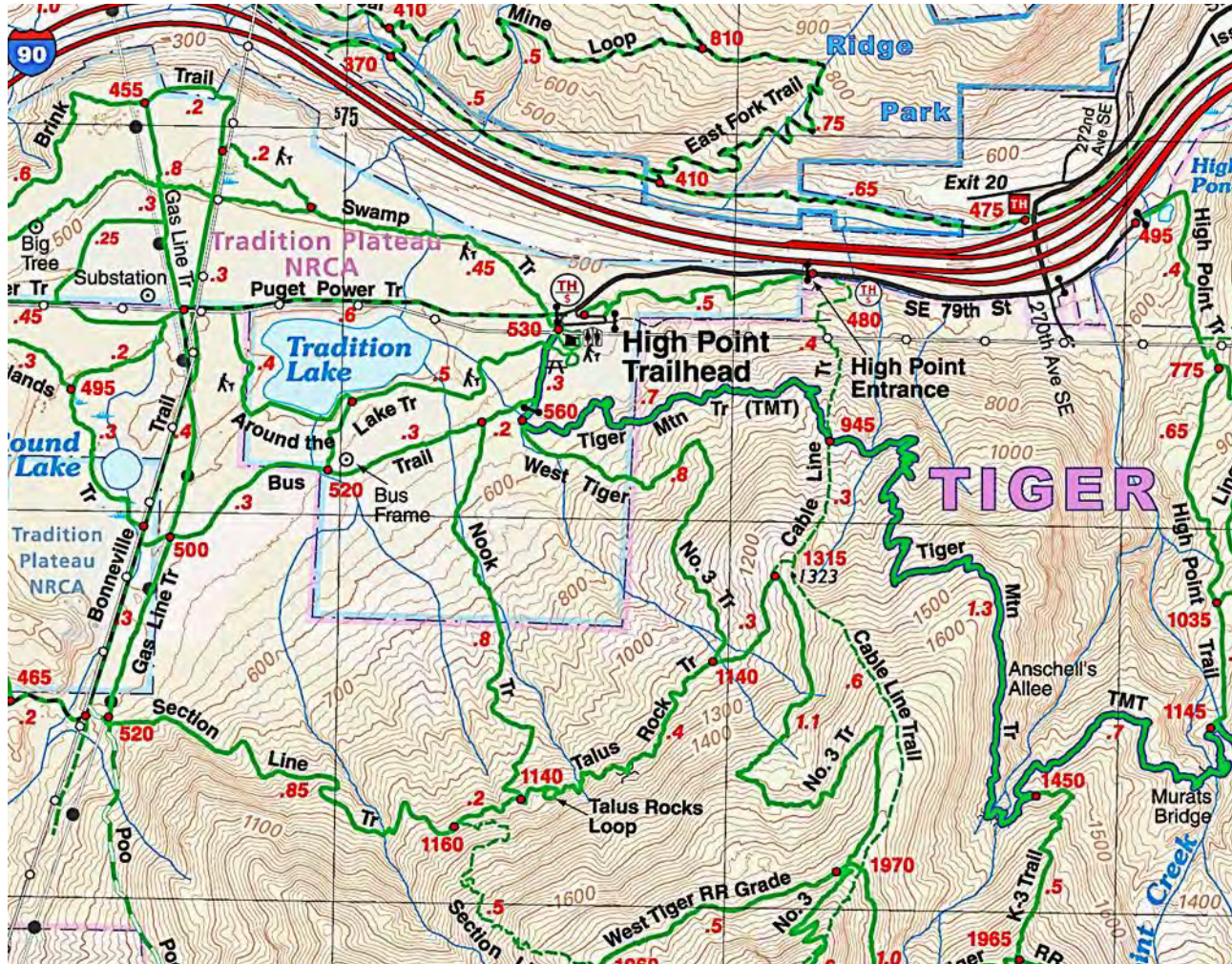
3. Read bearing at index mark



Q14. What answer do you get?

NOTE: When measuring a bearing on the map, you don't use the magnetic needle at all!

Now let's measure the bearing of a trail from your map and use it to make a navigation decision on a hike.



Let's say you walked about a mile south-southeast on the West Tiger 3 trail from the High Point Trailhead and come to a junction. (You already traced this trail on the map.)

- **Q15. Based on your map, what cross-trail do you think it is?** Circle the junction. (Hint: use the section distances on your map!)
- **Q16. Using your compass and map, what is the bearing on your map that you want to follow from that junction to stay on the West Tiger 3 trail?**
- **Q17. Which trail in front of you follows the bearing you just measured on the map?**

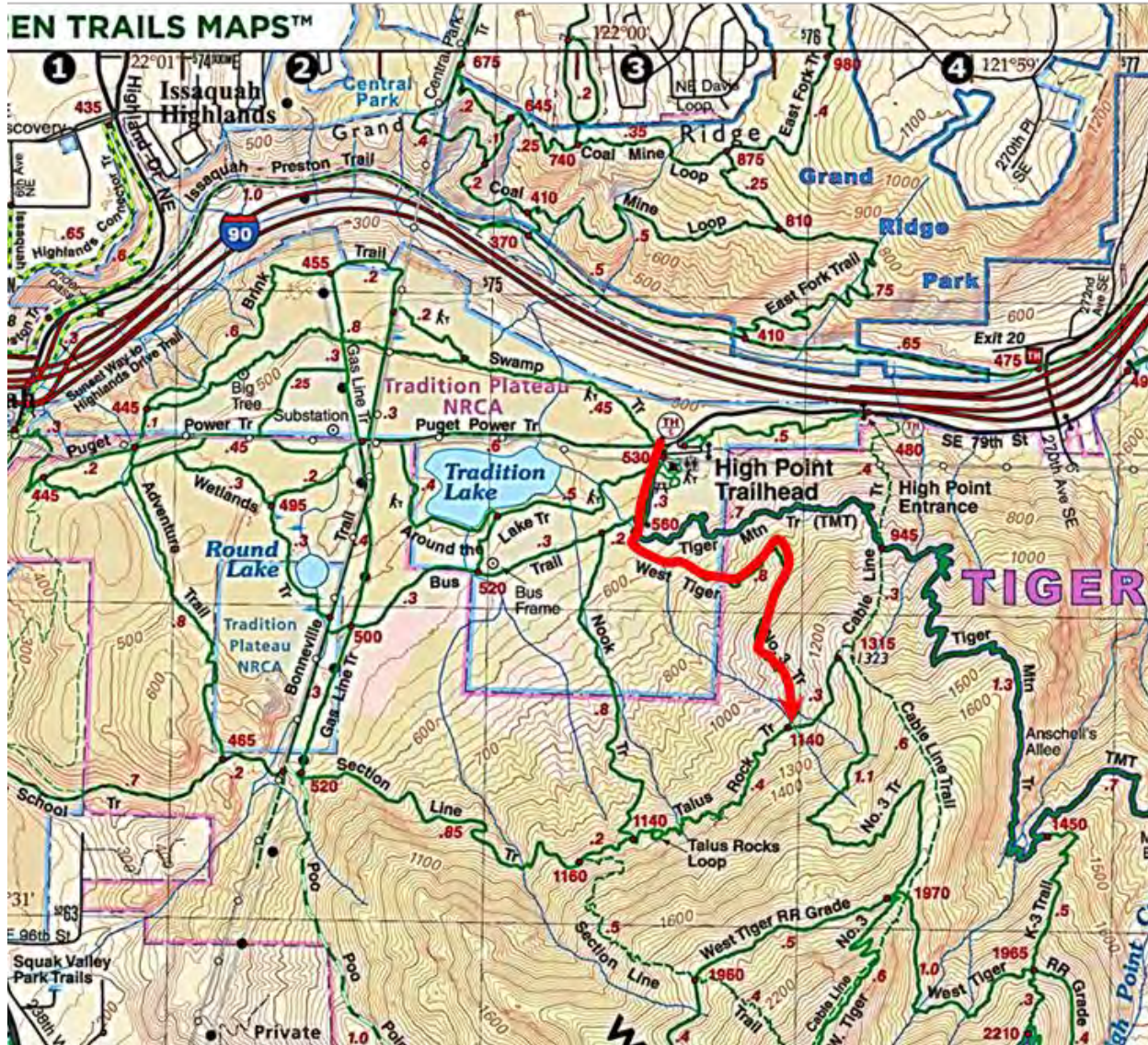
Determine your walking pace

Use your watch to measure the time it takes you to walk a known distance along a trail or street near your house. Then divide the distance in miles by the time in hours to get your walking pace in miles per hour.

Q18. Say it takes you 30 minutes ($\frac{1}{2}$ hour) to complete a 1.5 mile section of trail. (A) What is your pace in miles per hour? (B) How long would it take you to go 6 miles at this pace?

If you don't already know your walking pace, before the field trip go out in your neighborhood and estimate your normal walking pace for an uphill trail, a downhill trail and a flat trail.

Now use elapsed time with map info to stay found on a trail!

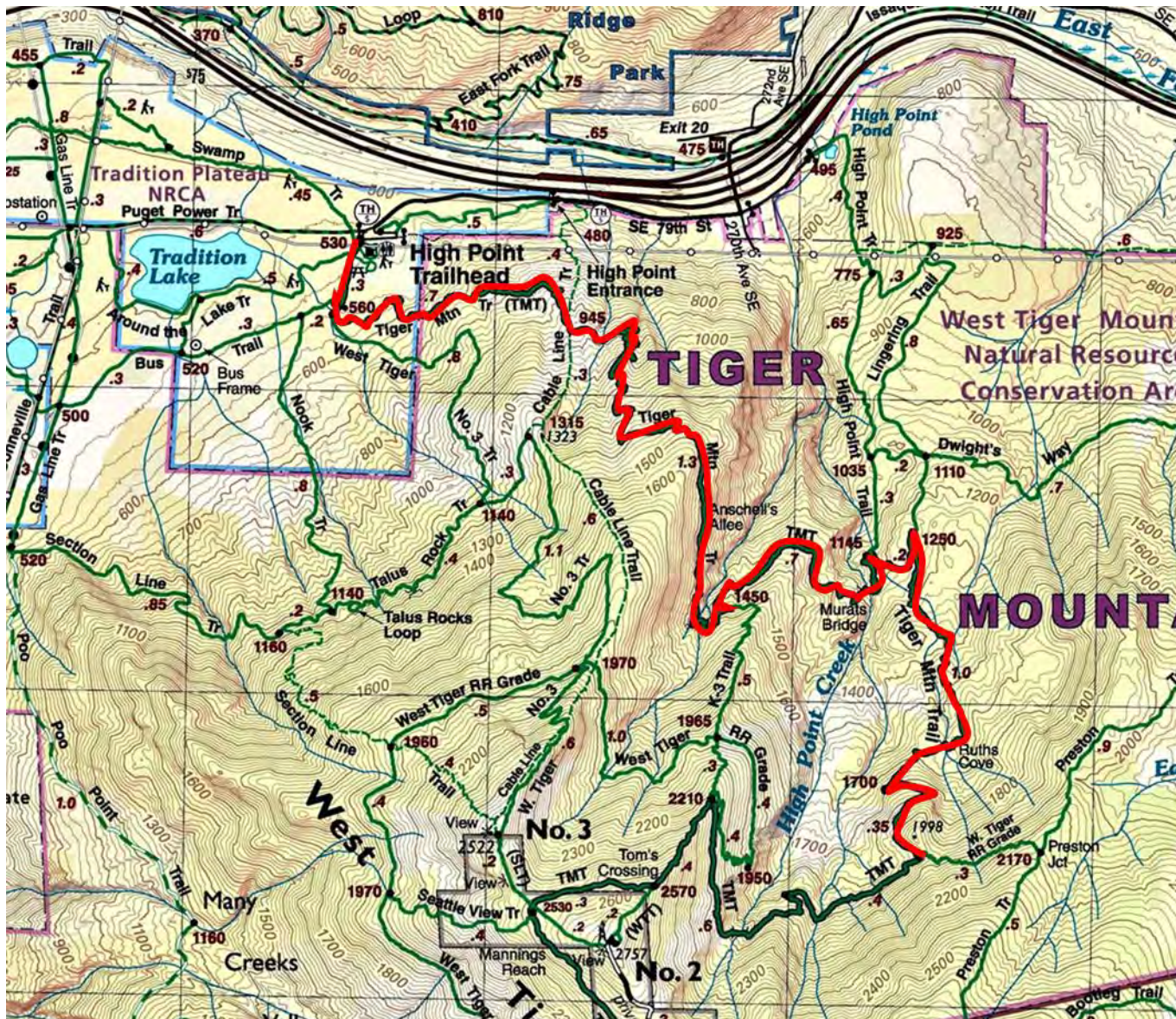


Say that you started up the West Tiger 3 trail from the High Point trailhead at 9AM. When you reached the Talus Rock Trail junction it read 9:30AM.

Q19. What was your walking pace over that section?

Hint: Find the distance along that section on your map, and divide the distance by the hours it took you to walk that distance (it might be a fraction of an hour!) to get the miles/hour.

Now combine the watch and altimeter info to stay found on a trail!



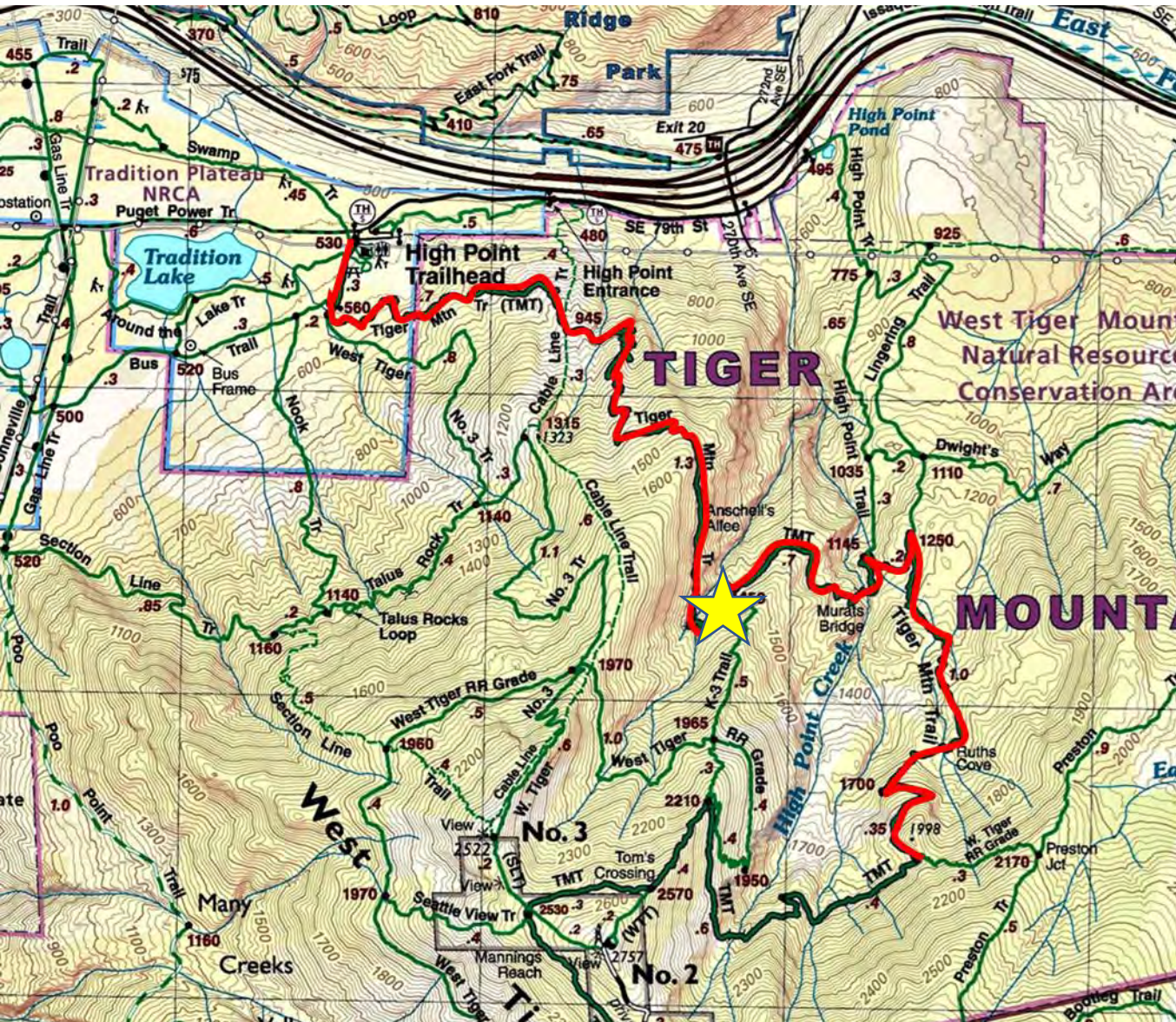
Trace the Tiger Mountain Trail (TMT) southeast from the High Point trailhead on your map, as shown.

Say you have walked an hour at your normal walking pace (2 MPH) and wonder where you are. Your altimeter says your current elevation is 1500 feet.

Q20. Describe your location on the map in terms of trail or terrain features near where you think you are.

Hint: Work out how far on this trail that you would go if you walked at your normal pace for one hour. Where does a 1500-foot contour cross your trail near that point?

3. Use a watch (elapsed time) and altimeter - continued



OK, the star marks where you would have found yourself after walking an hour.

Now say you walk nearly another hour and come to an unmarked junction. Your altimeter says 1960 feet.

Q21. From your map, what trail do you think you have reached?

Q22. If you are correct, what bearing would this trail be heading from your position based on the map?

Q23. What bearing would you want to be following to stay on the TMT?

Preparing for the Staying Found Online Workshop, May 16 2023

Find the trail segments and landmarks on your Green Trails map that are referenced in this homework. We'll revisit those places and share the answers to the homework questions, as well as new applications of those concepts, in the Virtual Seminar.

Also, check out Wilderness Navigation: Finding Your Way Using Map, Compass, Altimeter, & GPS (Mountaineers Outdoor Basics) by Mike Burns and Bob Burns, by Mountaineers Books 2012 for more examples and explanation of the concepts in the seminar.

