

A group of people are sitting on the grass, looking at a map. One person is pointing at the map, and another is holding a compass. The scene is outdoors, and the people are wearing colorful clothing.

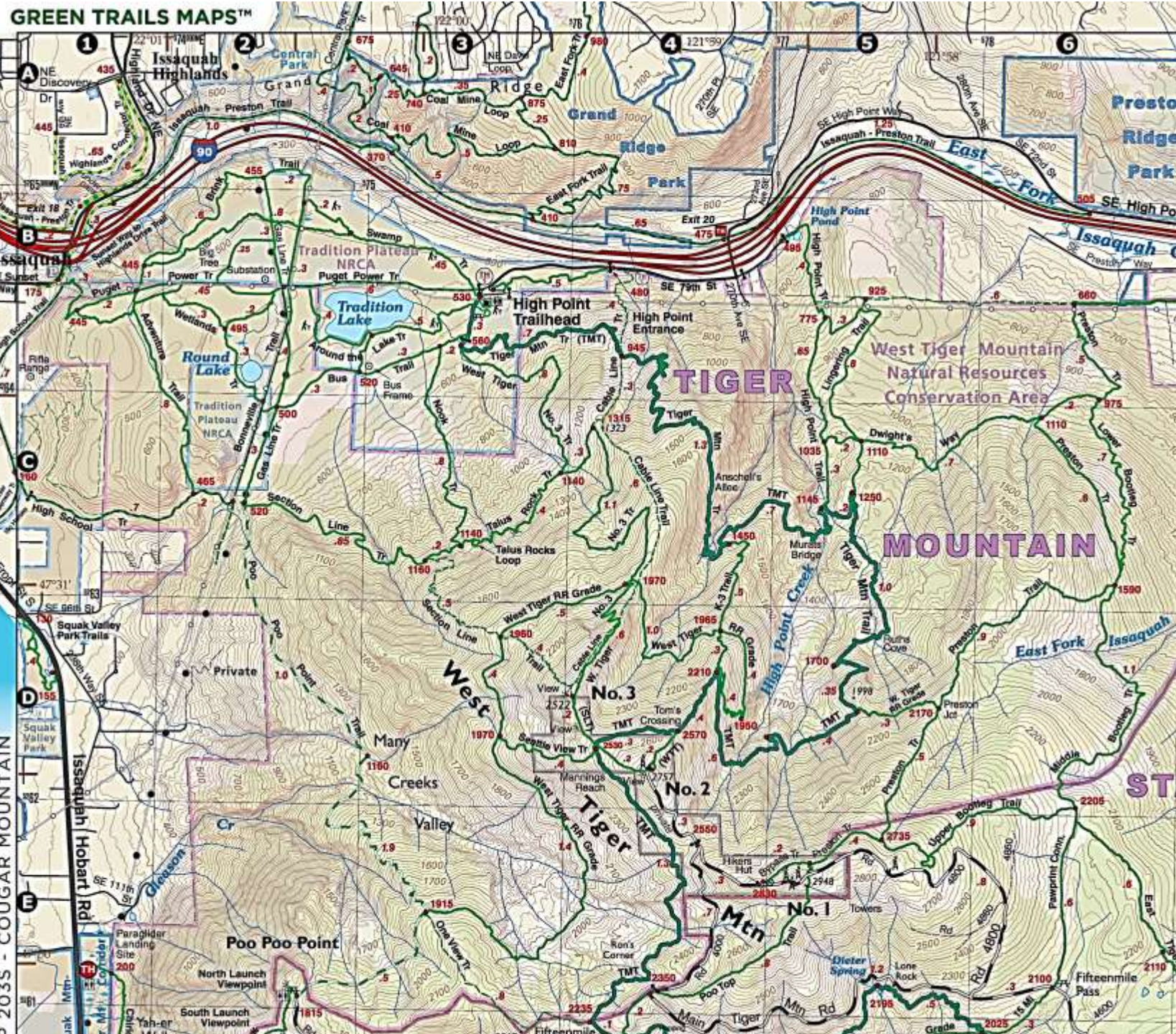
# Staying Found” Tools and Concepts

Pre-work for May 14 2024 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 14!
- 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 your Staying Found field day.*





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.

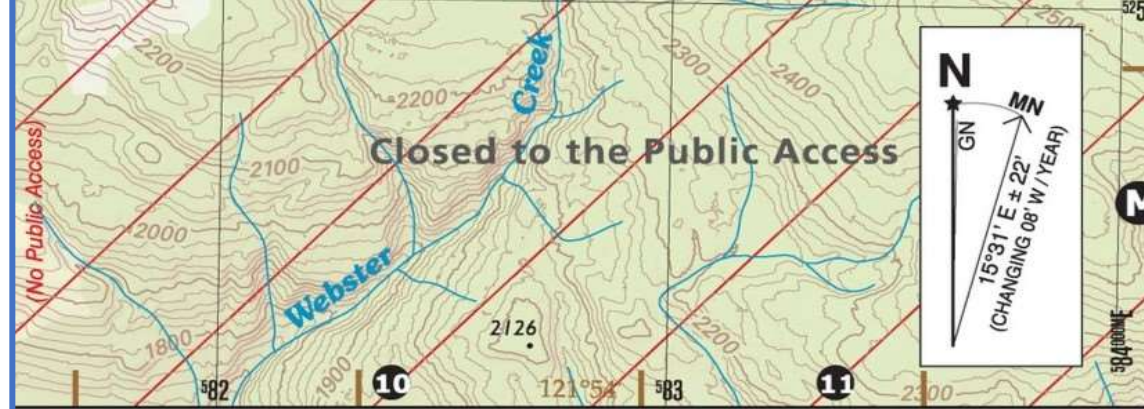
We will focus on the upper left quarter of the map, as shown here.



# Map Legend

First, find the Green Trails map legend file in the course materials and answer the following:

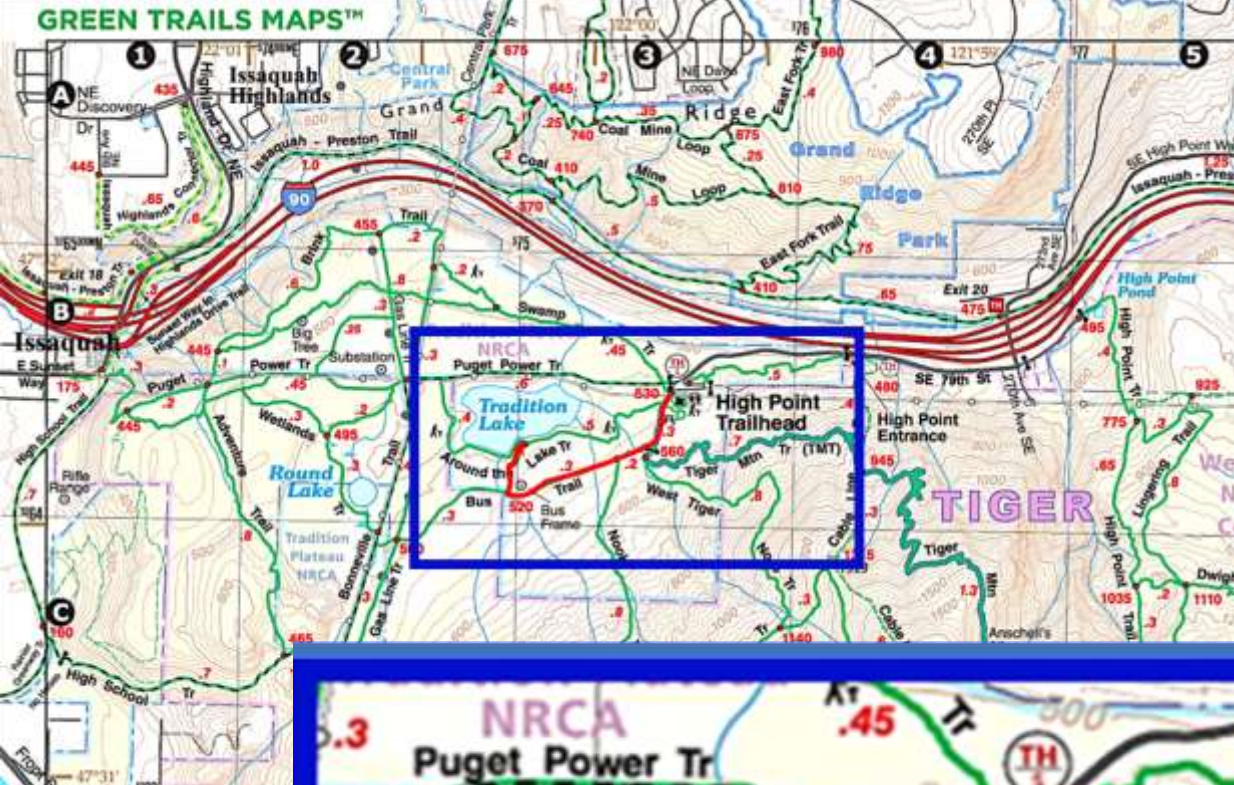
- What direction is North on the map? South, east, west?
- Find the High Point Trailhead education shelter
- Find interstate 90 and the access road you drive on to get to the trailhead
- Find a hiker-only trail, and an unmaintained trail
- Find a lake. Find a creek that crosses the Tiger Mountain Trail.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



	Interstate Highway / State Hwy		Primary Trailhead / Parking <i>WA State Discover Pass required</i>
	Access Arterial		Trailhead with Limited/No Parking <i>WA State Discover Pass required</i>
	Forest Access / Recreation Road		Primary Trailhead with Parking
	Gravel Road		Trail Access - Limited/No Parking
	Minor Road / Other Forest Road		Other Parking  Limited Parking
	Trail - Hiker only		Toilet
	Trail - Hiker / Horse only <i>* Subject to Seasonal Closure</i>		Point of Interest
	Trail - Hiker / Horse / Mtn Bike <i>* Subject to Seasonal Closure</i>		Picnic Area
	Trail - Hiker / Mtn Bike <i>* Subject to Seasonal Closure</i>		Gate
	Trail - Mtn Bike only <i>* Subject to Seasonal Closure</i>		Interpretive Center
	Trail - Mtn Bike only <i>* Subject to Seasonal Closure</i>		Interpretive Trail / Site
	Trail - Paved (non-motorized)		Educational Shelter
	Trail <sup>1</sup> - Unmaintained/Route		Viewpoint
	Trail - Planned		Tower
	Approximate Miles Between Dots		Bench
	Approximate Trail Elevations		Spring
	State Dept. of Natural Resources		Waterfall
	DNR - Natural Resource Conservation Area (NRCA)		Wetland
	King County Park		
	City Park		
	USDA - Forest Service		
	Private Land within public land		
	Other Private Land		
	Cedar River Watershed <i>Closed to Public</i>		
	Cedar River Watershed <i>Limited Public Access- Trails only</i>		
	47°32' 121°53'		Latitude / Longitude
	5265000M 582000E		UTM - Northing/Easting
			Electric Utility Line
			Natural Gas Utility Line
			Vegetation Coverage
			Grass/ Hardwood/
			Regenerating Conifer
			Shrub / Small Conifer
			Conifer

See reverse side for additional trail and map information. \* Trails subject to seasonal closure: typically October 15/Nov. 1 thru April 1/April 15





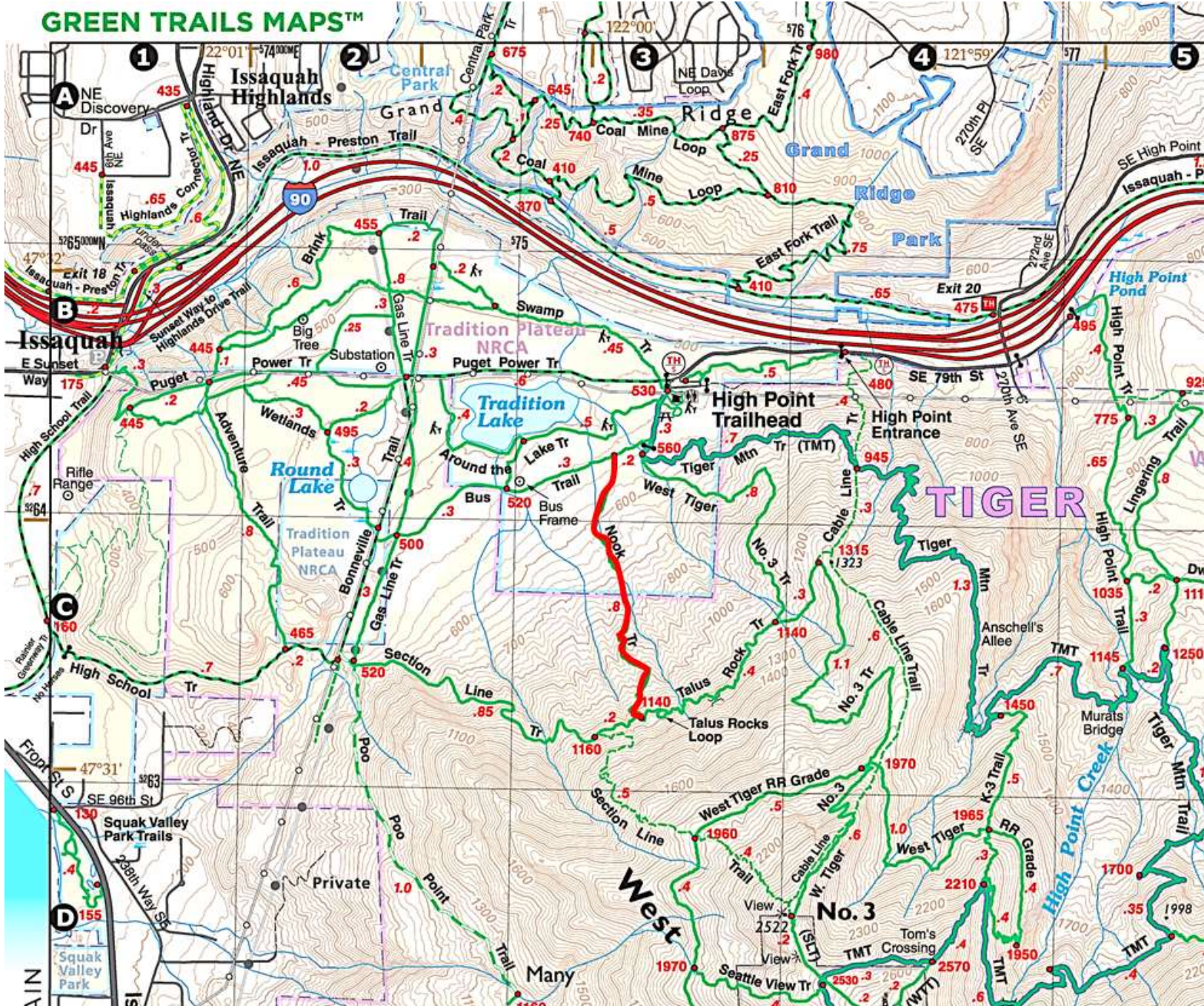
Let's find the first hiking route that we'll be referring to in the seminar!

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:

- Find the turnoff from the Bus Trail to the Around the Lake trail.
- Tell if you've missed that turnoff.





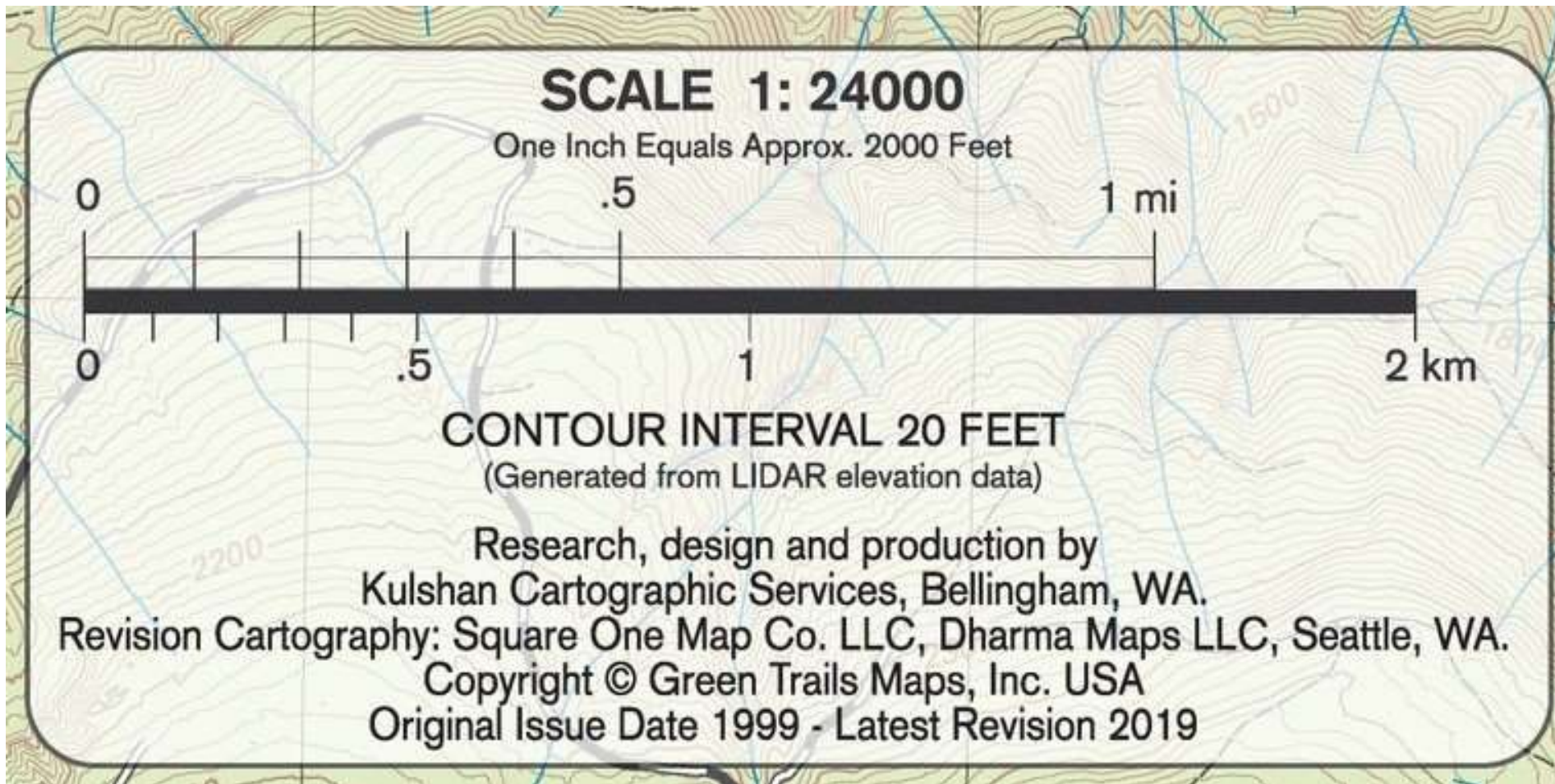
Now find and trace on your map the Nook Trail between the Bus trail and the Talus Rocks trail, as shown here.

**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.**

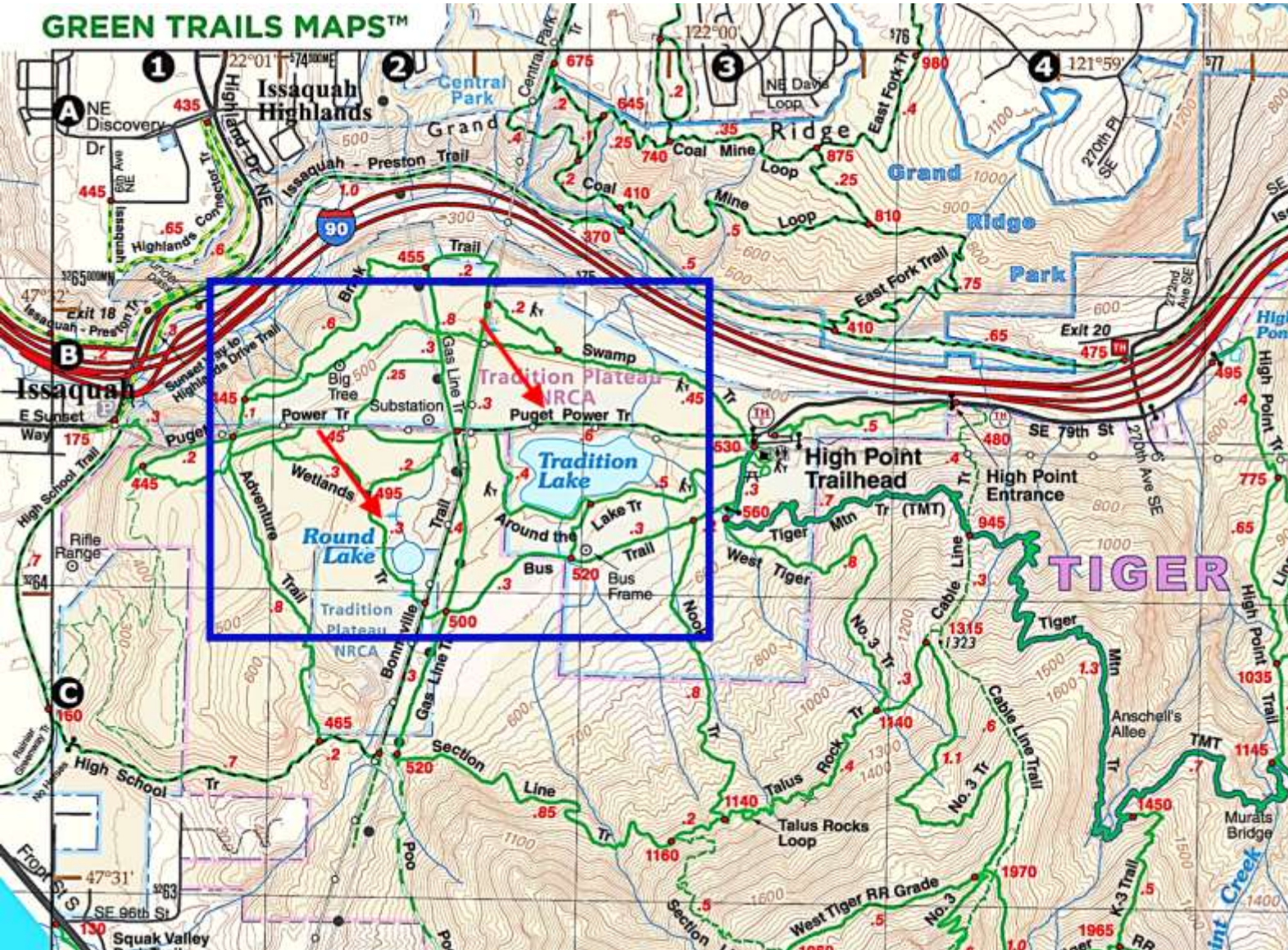
**Q2. What distance on the ground is represented by one inch on your map?**



Note: Different maps can have very different scales!



# Interpreting the Map Scale



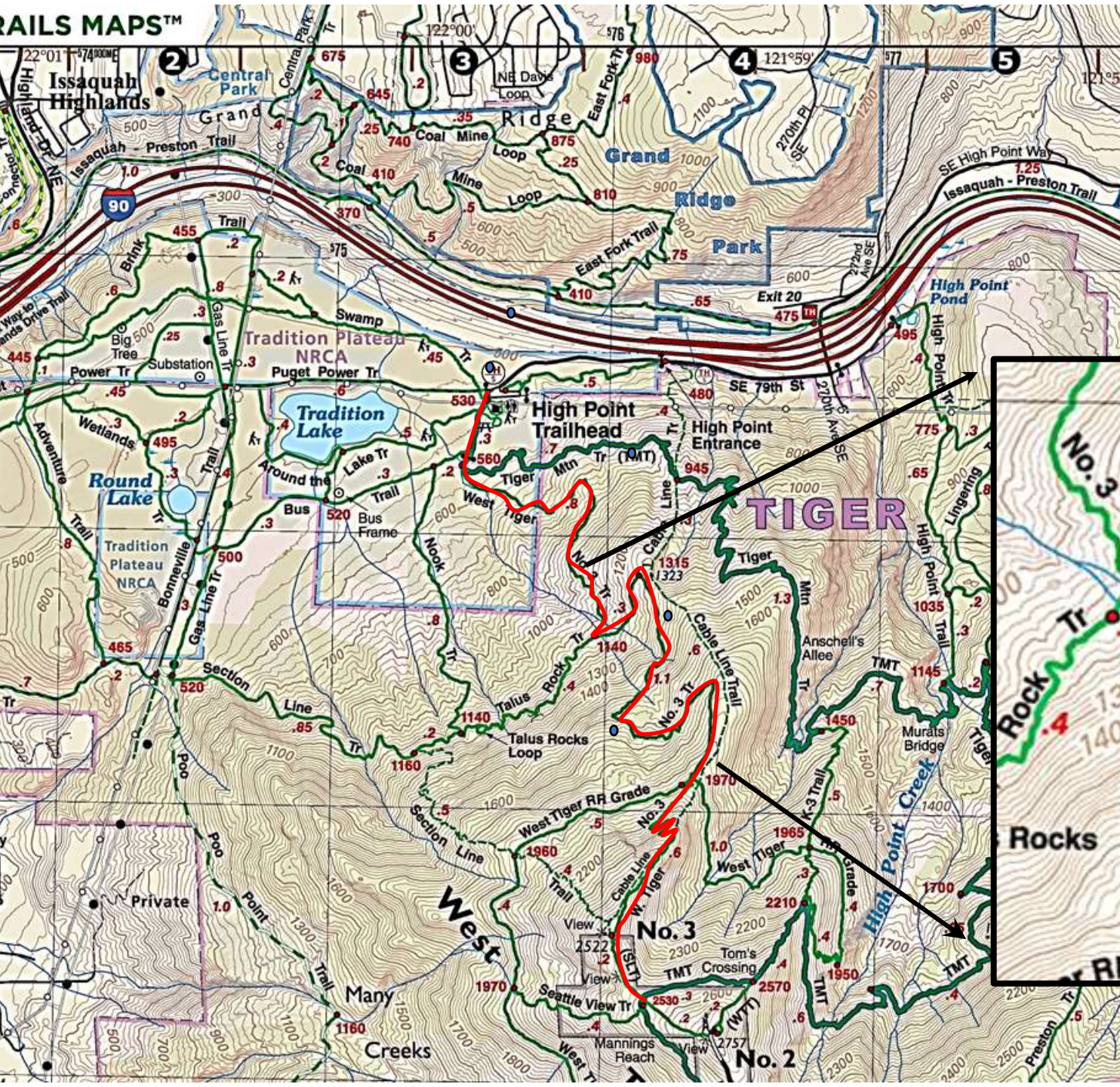
**Q3. What is the straight line distance in feet between Round Lake and Tradition Lake?**

*NOTE: Use the matching scale and map from the Course Materials, or the ones from your Green Trails map, NOT the one copied into this homework!*

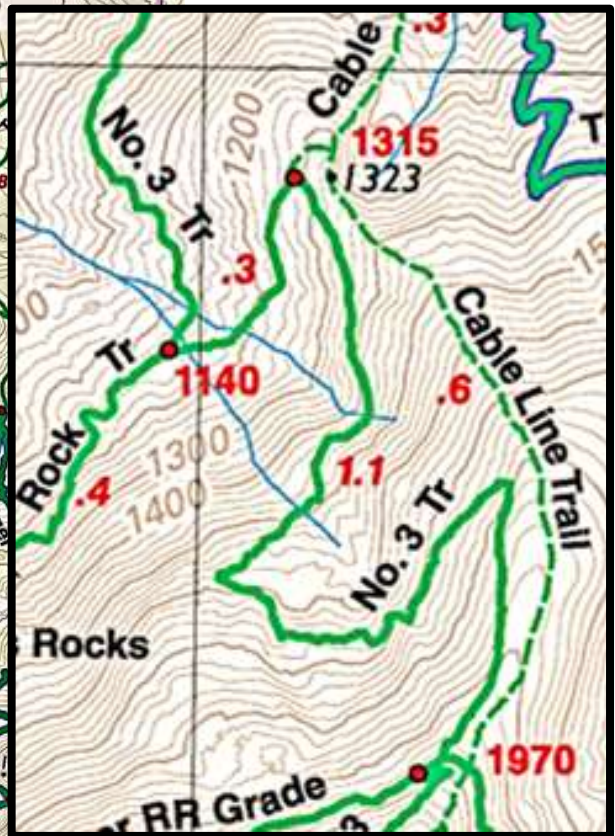
*HINT: Use a ruler to measure the distance on the map between Round and Tradition lakes, then hold that measurement up to the corresponding scale from that same map!*

➤ *Remember that there is a ruler on your compass!*





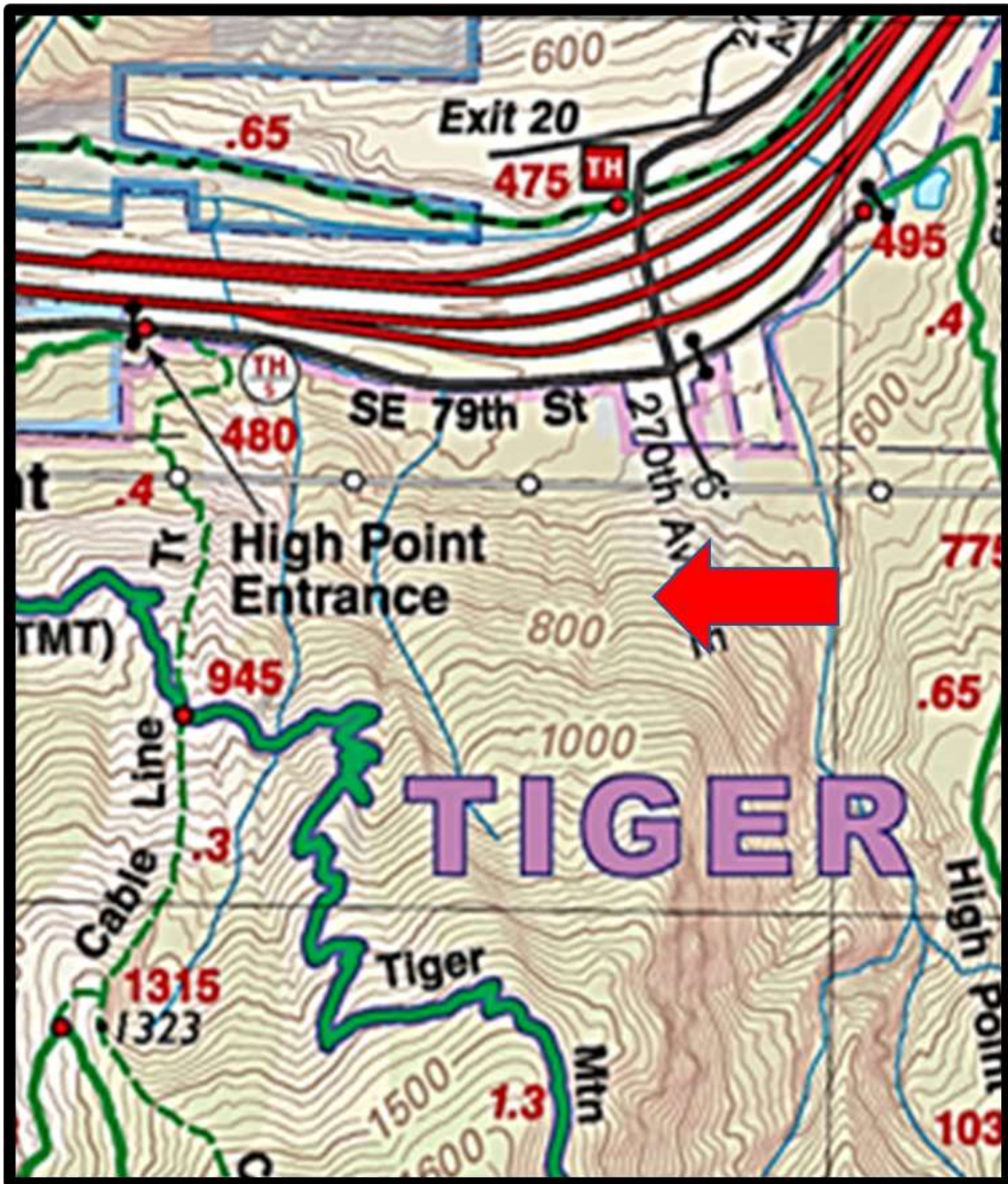
On your map, find and trace the West Tiger Mountain #3 trail to the junction of the TMT (Tiger Mountain Trail), just beyond the West Tiger #3 summit as shown.



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.

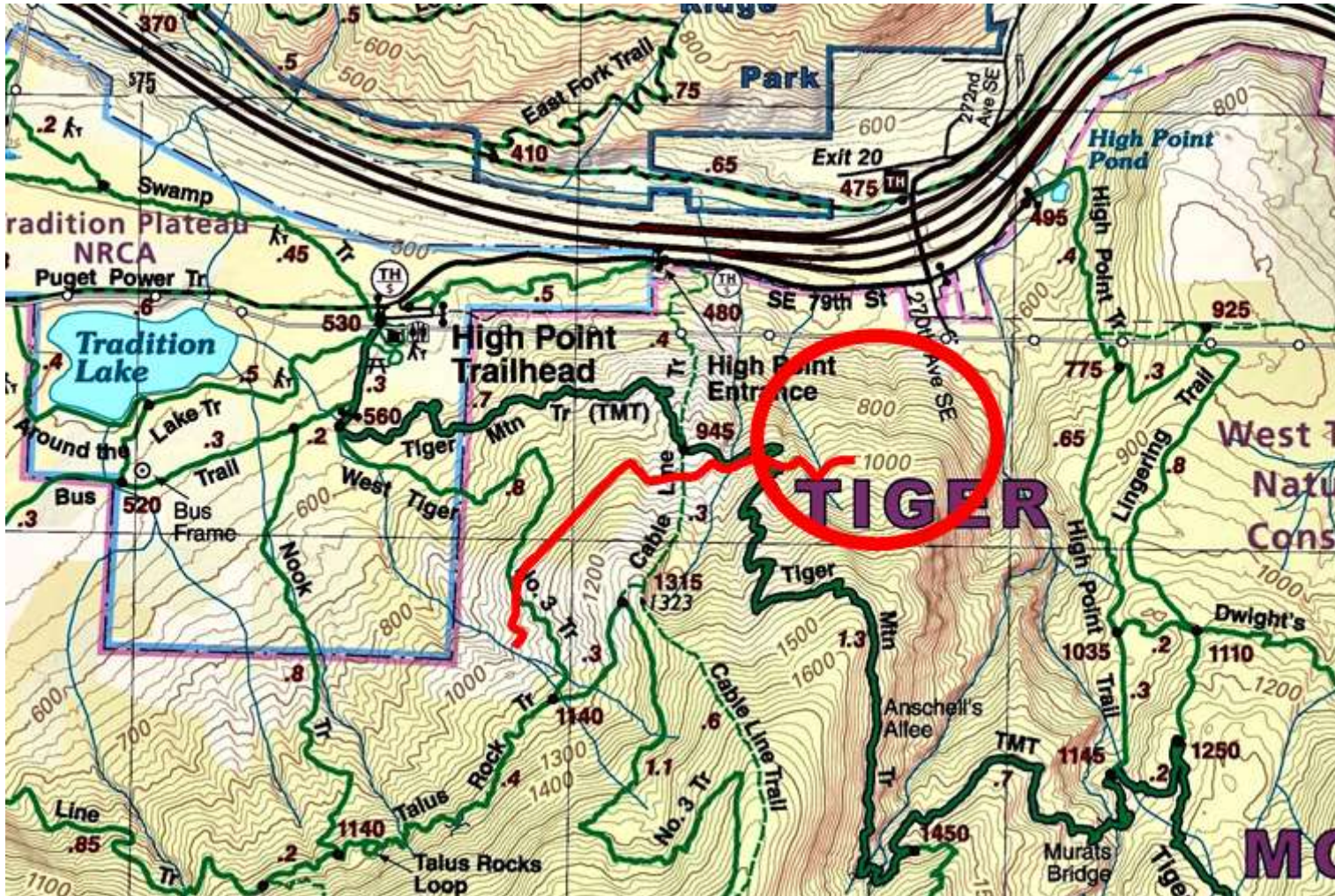
On your map, find the words 'High Point Entrance' and study the brown wavy lines just below and to the right of those words. These are "contour lines".

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 two junctions?



# 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:

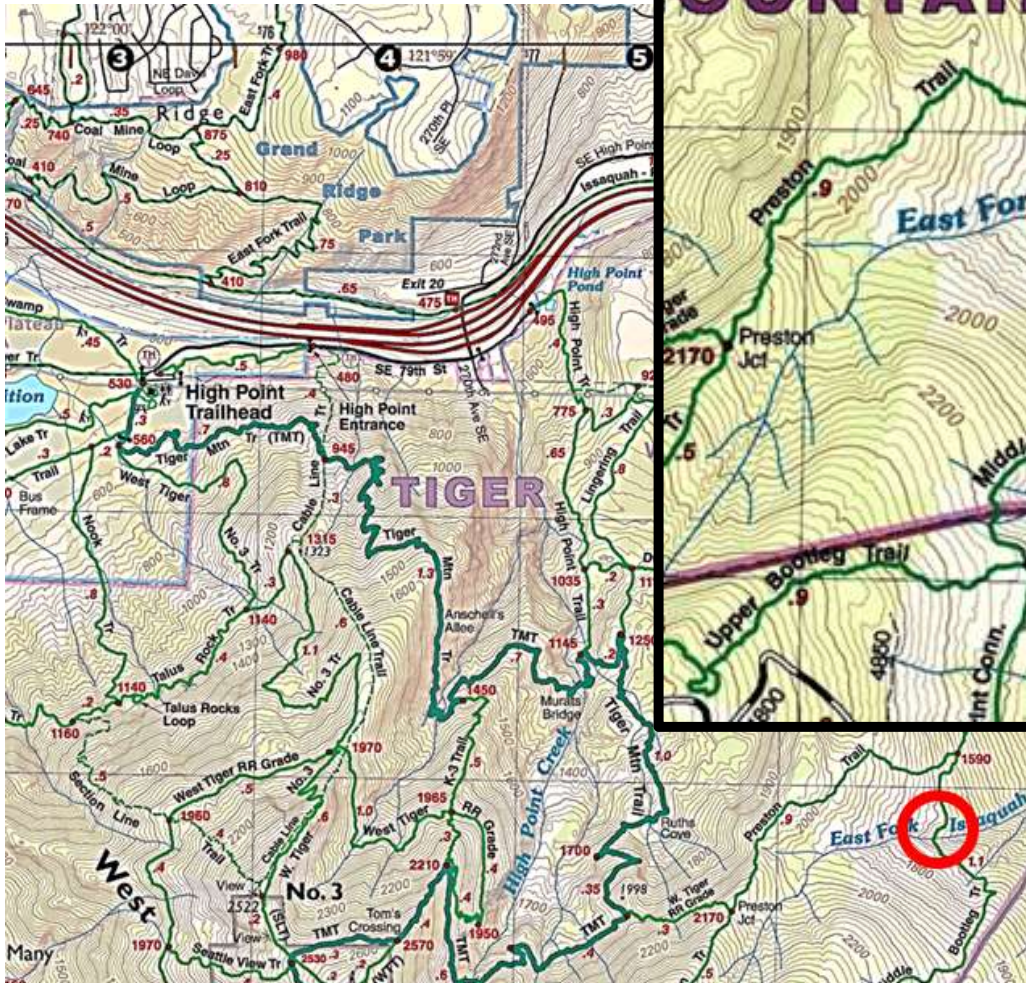
**Q5. How many feet are between each Index Contour on your map?** (Hint: subtract the smaller from the larger elevations of two adjacent Index Contours.)

**Q6. Count the number of spaces (or 'intervals') between two adjacent Index Contours. How many feet are there in each space? 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 intervals up or down to the circled spot on the trail from the nearest index contour, multiply by the contour interval, and add or subtract that number to/from the index contour elevation where you started counting.*

*Remember that you have a magnifier on your compass!*



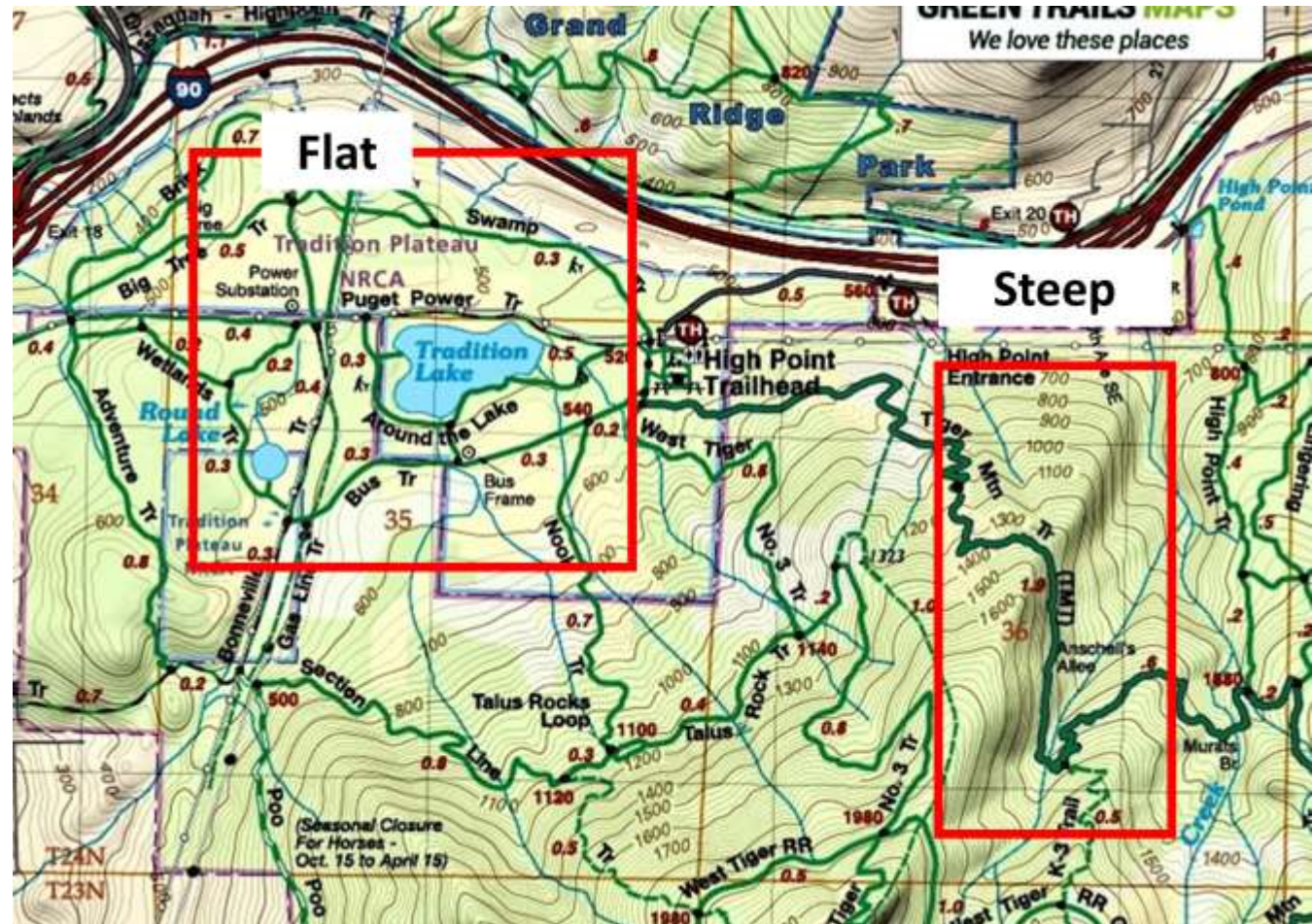
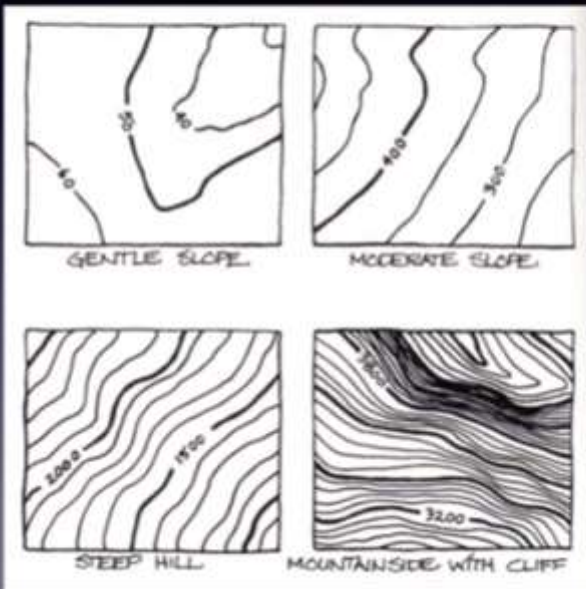
# Understand the terrain you can expect by studying contour lines on your map

Here is a flat and a steep area on your Tiger Mountain map. *Look on the map to find some others!*

## Flat or Steep?

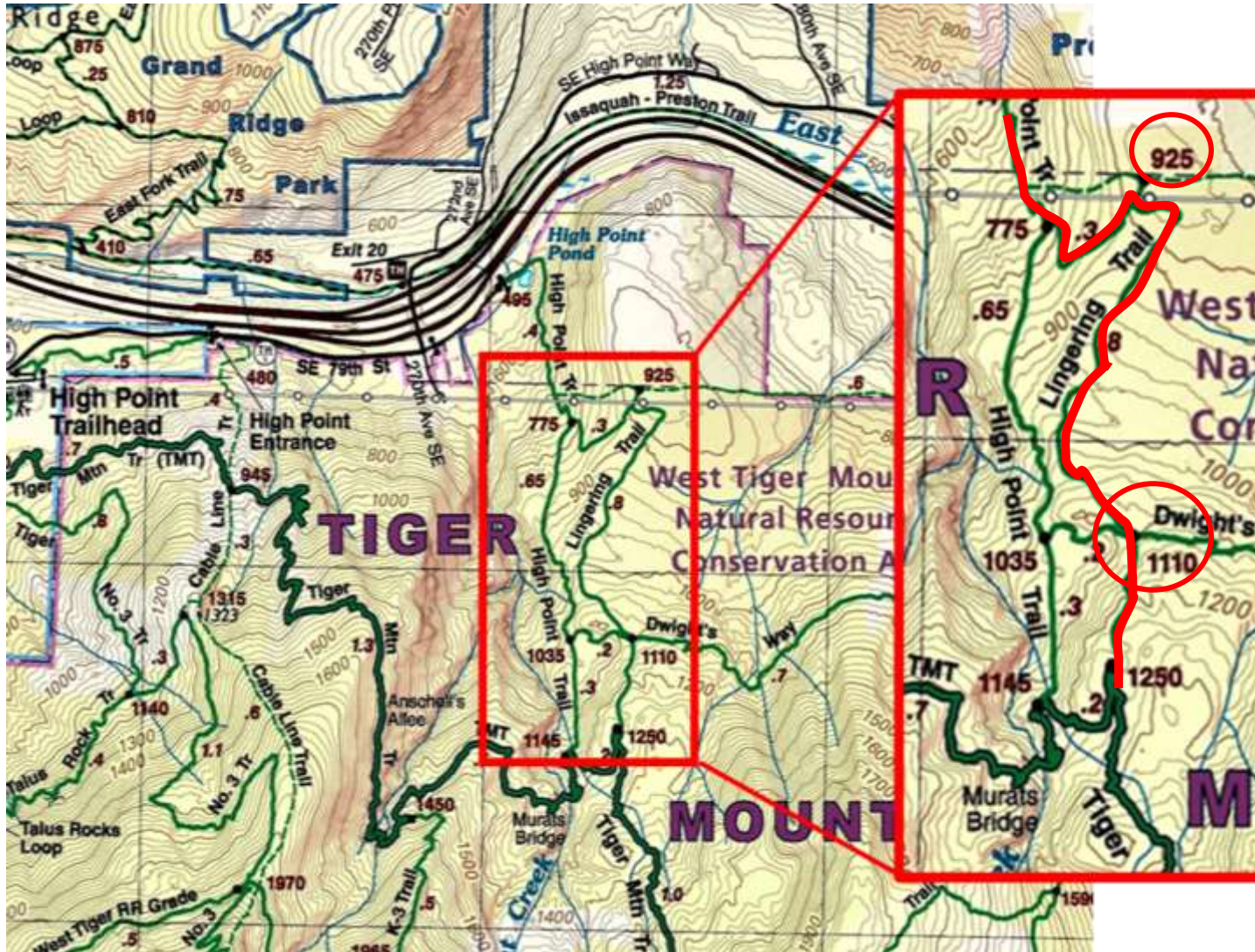
### Contour rule 1:

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 junctions marked 925 and 1110.**

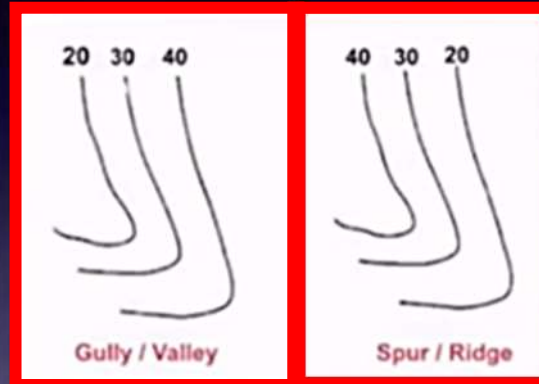
This kind of 'situational awareness can be very helpful to you in figuring out where you are on the trail!



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

## Gully or Spur?

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



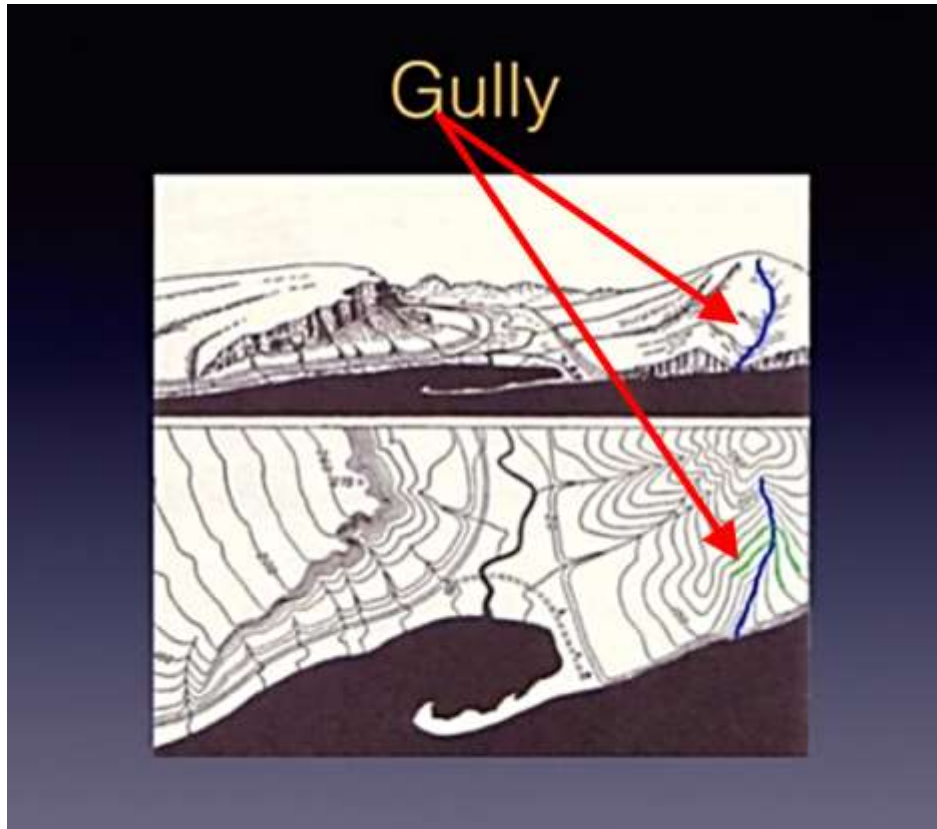
*“Ridges roll down and gullies go up!”*

**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

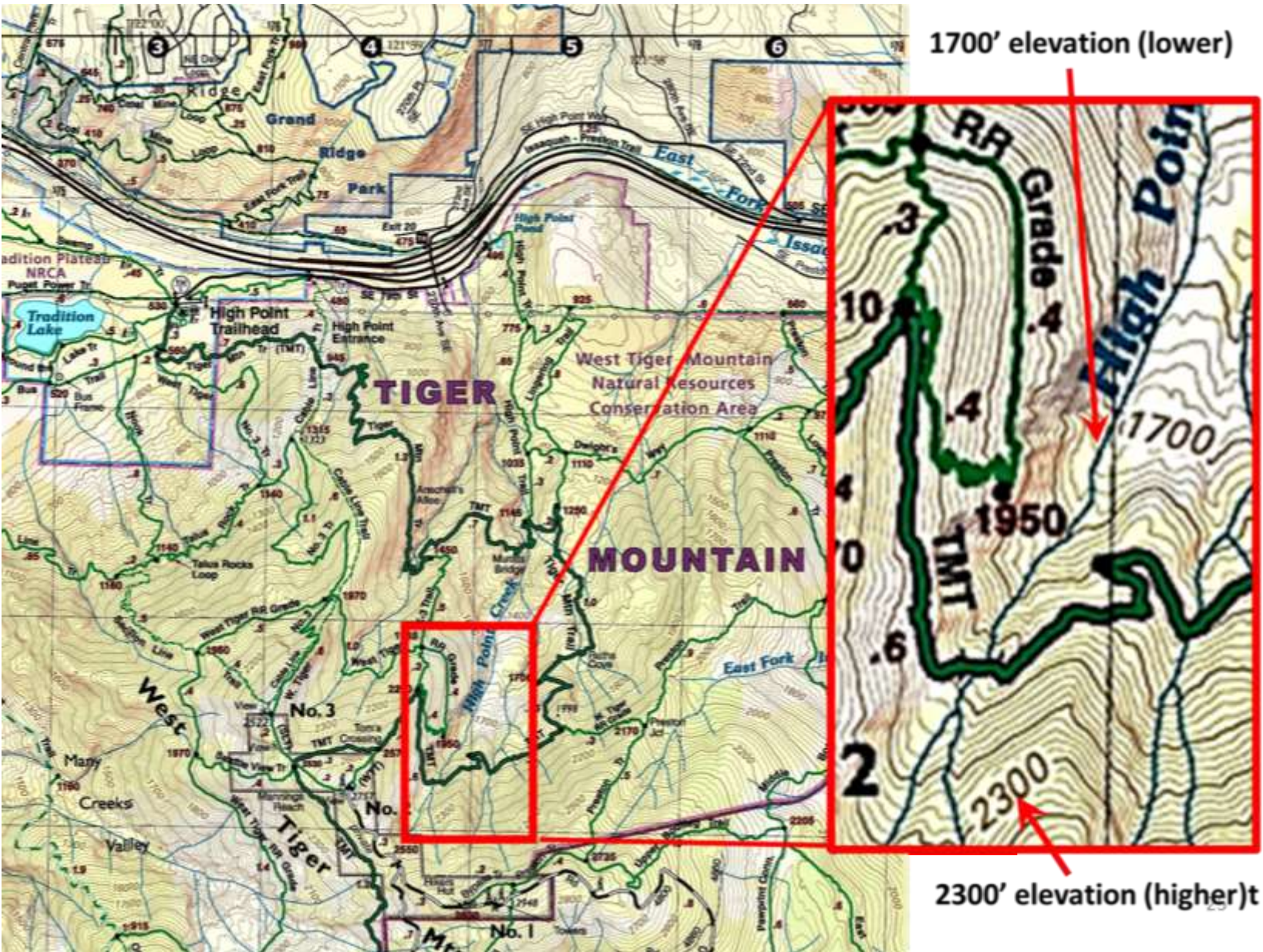


Creeks or rivers are usually great giveaways for the location of a gully or valley. The direction of flow of water (always downhill!) indicates what direction is uphill and downhill.

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. Draw an arrow on this diagram showing which direction is downhill along High Point Creek.** Which way do the contours bend along the creek (pointing uphill or downhill)?

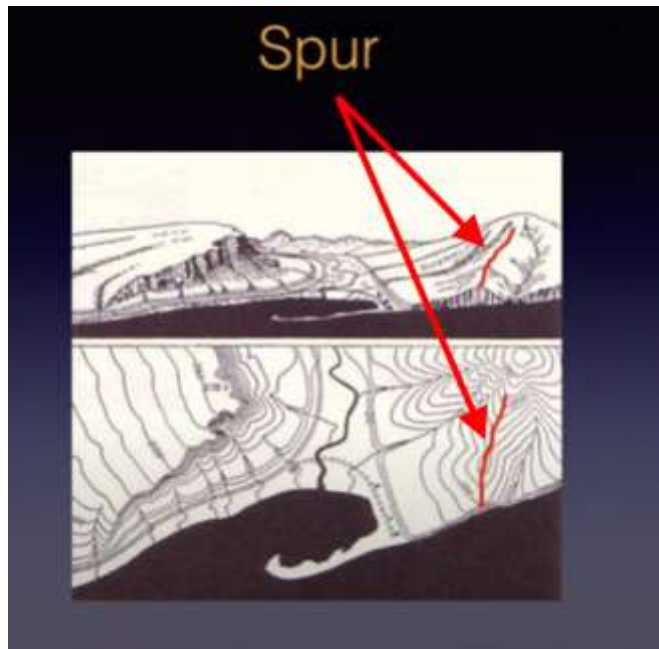
**What does this tell you – is this a gully/valley or not?**

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.



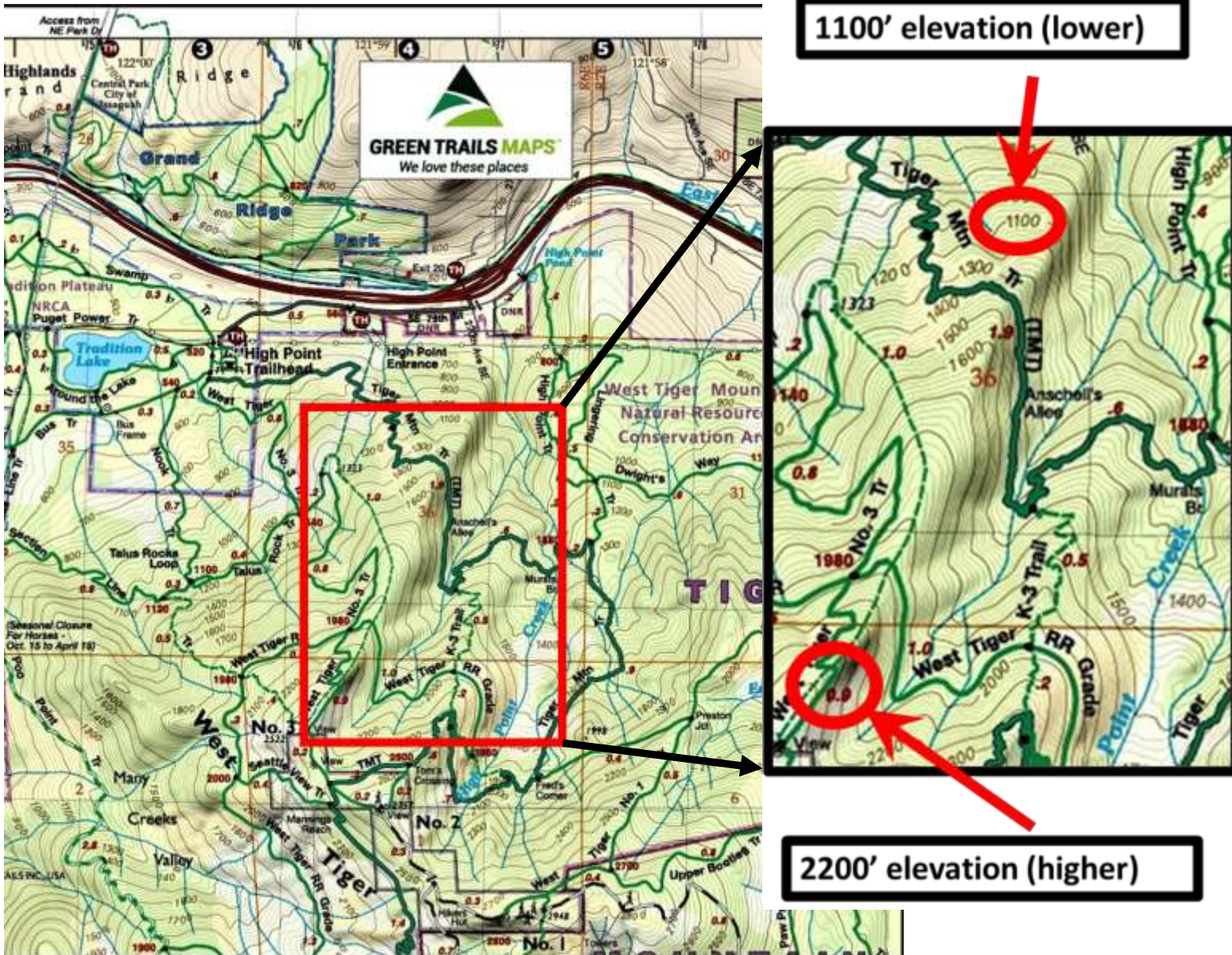
First use the elevations marked on the Index Contours to determine which way is uphill and which way is downhill.



Q10. Which direction do the contours curve in these drawings? Does this mean they are gullies 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.

**Q11. Based on the elevations along this feature and the shape of the contours along it, is this a ridge or a gully?**

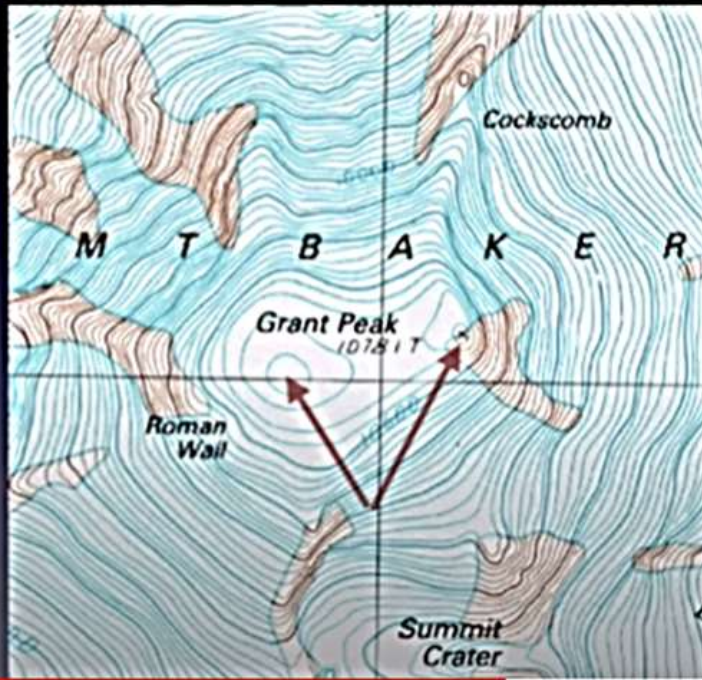
- Hint: Remember that “ridges roll down and gullies go up!”



# 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)

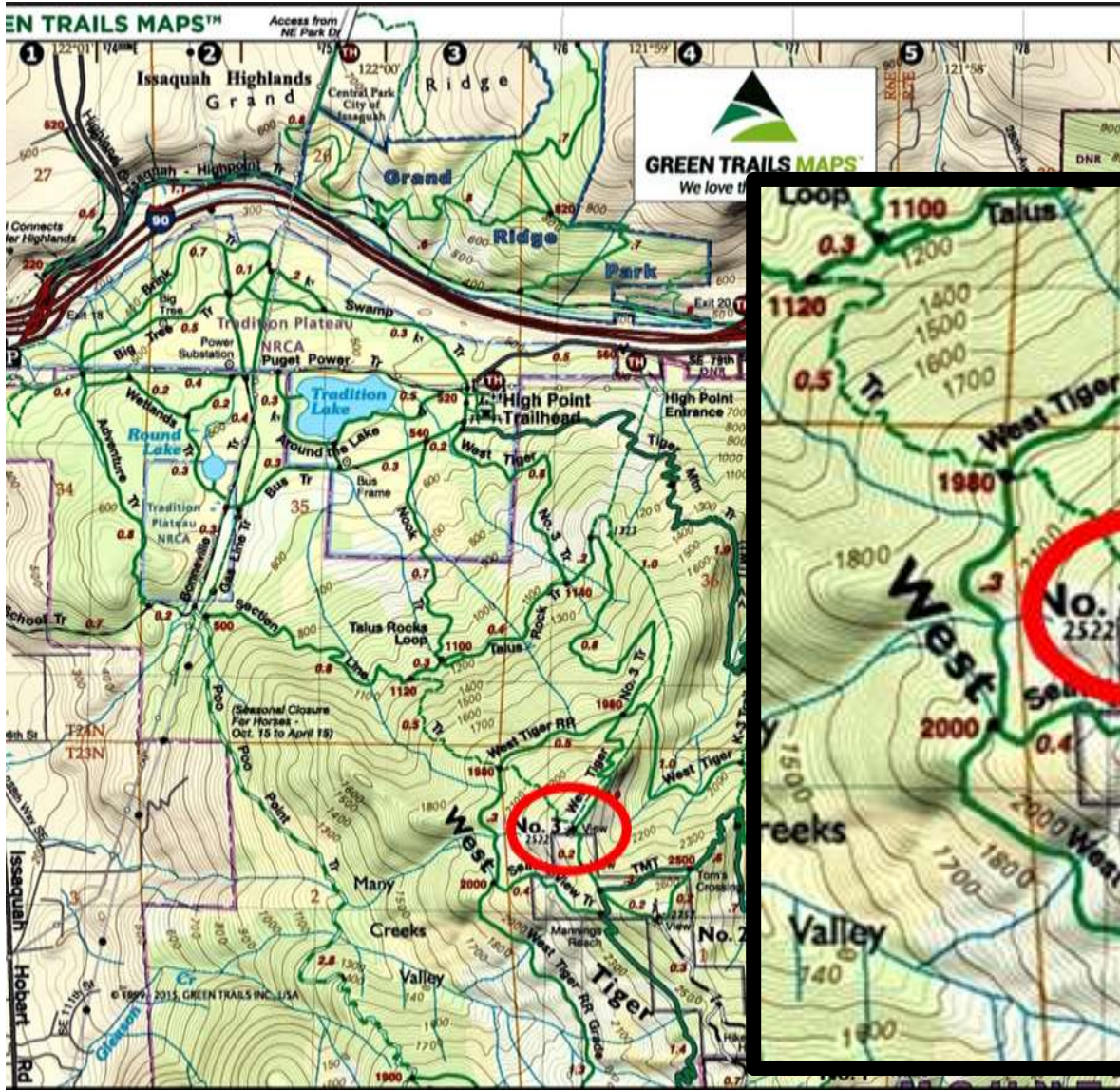


On your Tiger Mountain map, find examples of a summit or peak (usually has an elevation printed next to them) and a knoll or hill.



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

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



**Q12. Draw arrows along two ridges and two gullies that drop from that peak.**

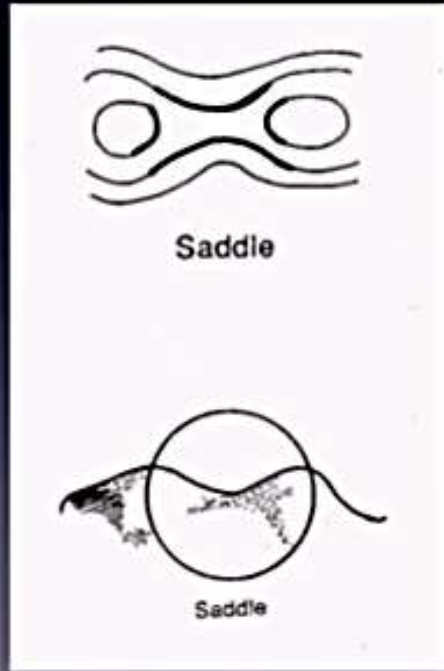




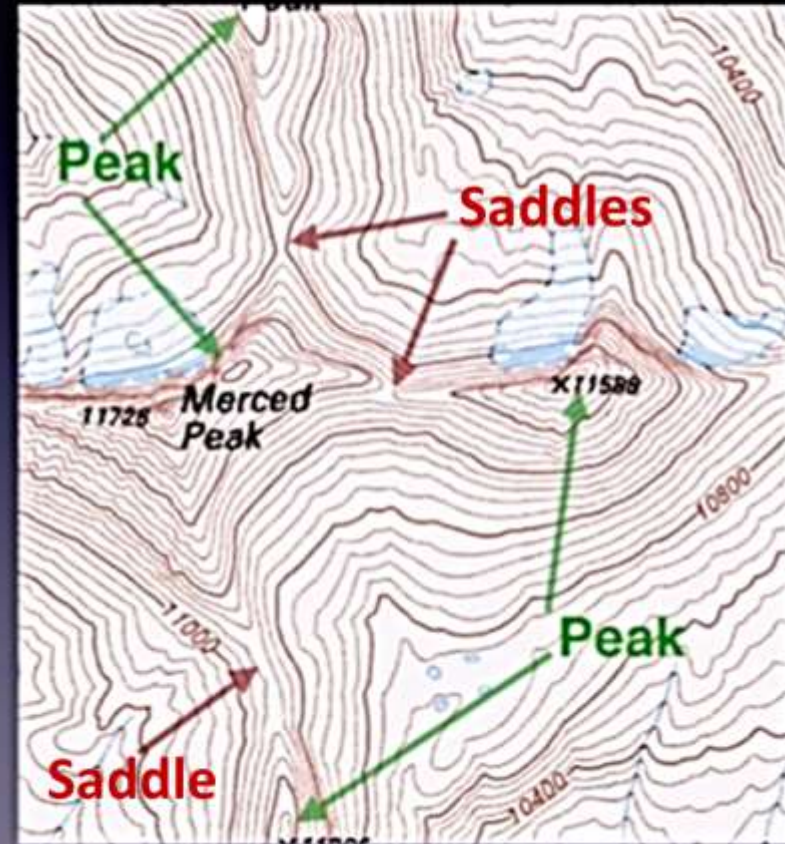


# Understand the terrain you can expect by studying contour lines on your map

## Saddles

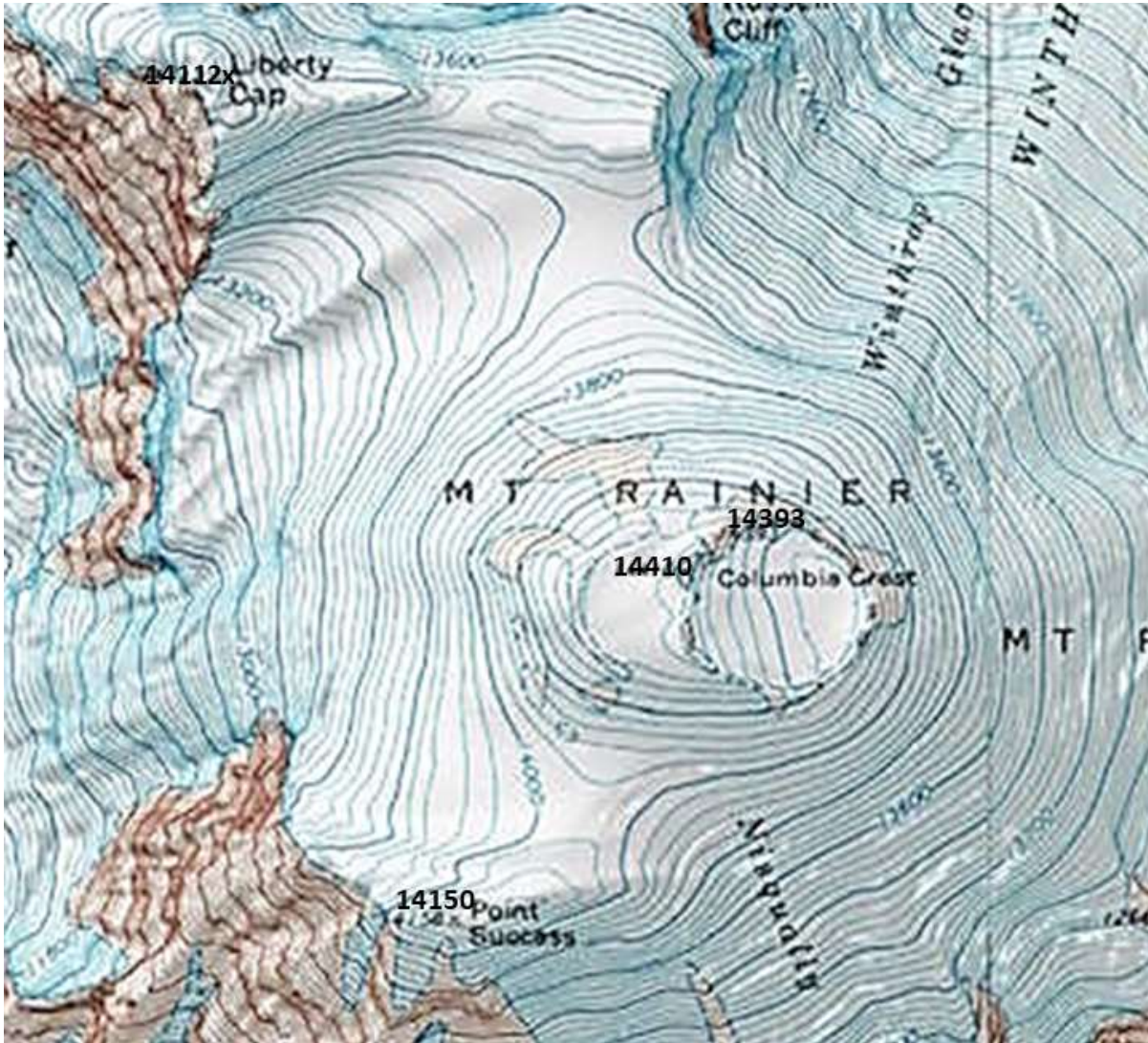


## Saddles





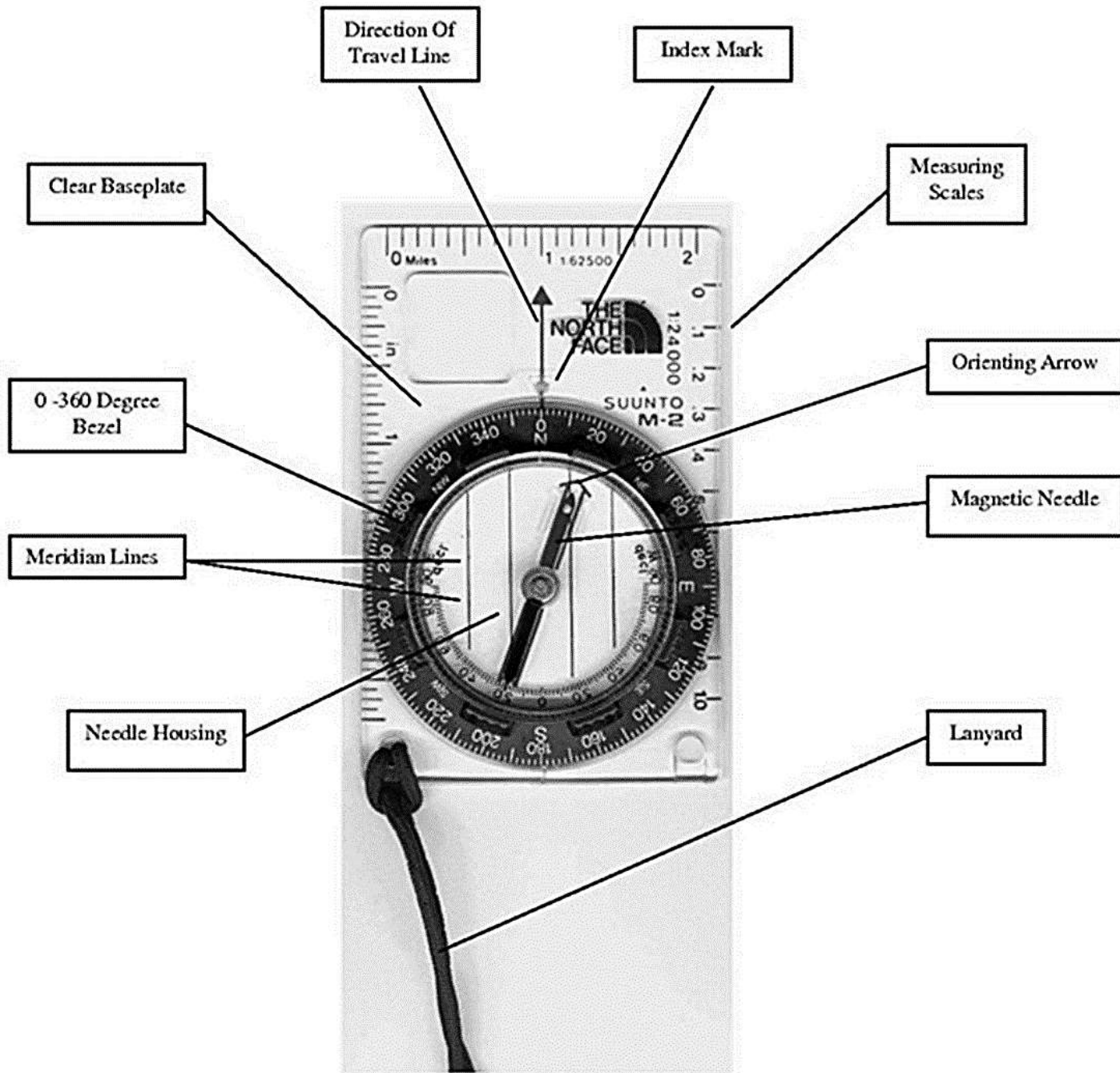
# Understand the terrain you can expect by studying contour lines on your map



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

- **Q14. Circle the main summit and a secondary summit. What are the elevations of the two summits?**
- **Q15. Is the terrain flat or steep immediately around the main summit?**
- **Q16. 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](#) and [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.*



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

***Q17. After you've oriented yourself and your map, as described, 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!*









**Q18. Pretending to stand at the star facing north, and looking at your map:**

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



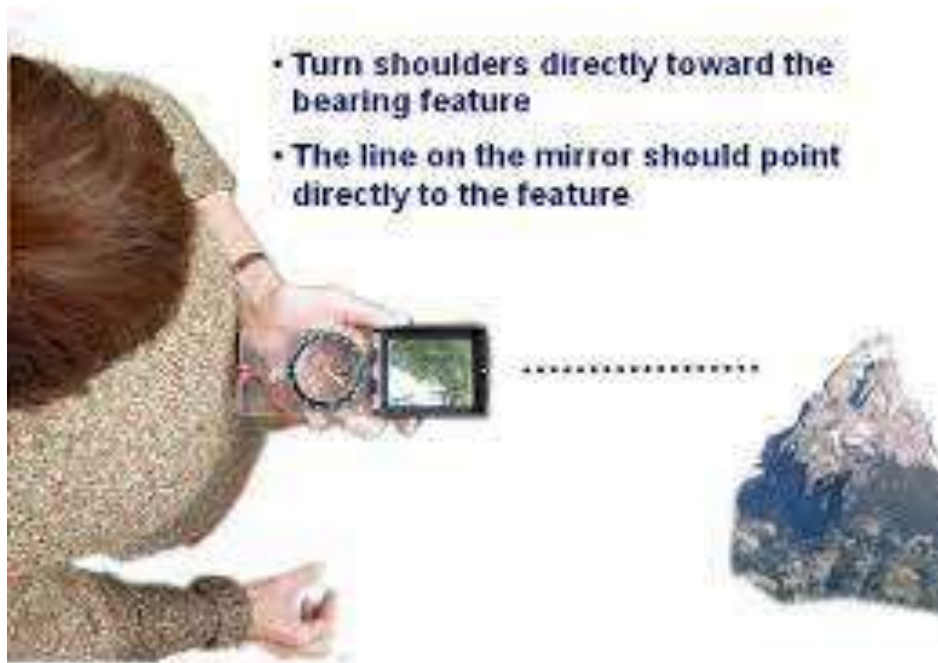
# Now let's learn how to measure a bearing "in the field"

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.

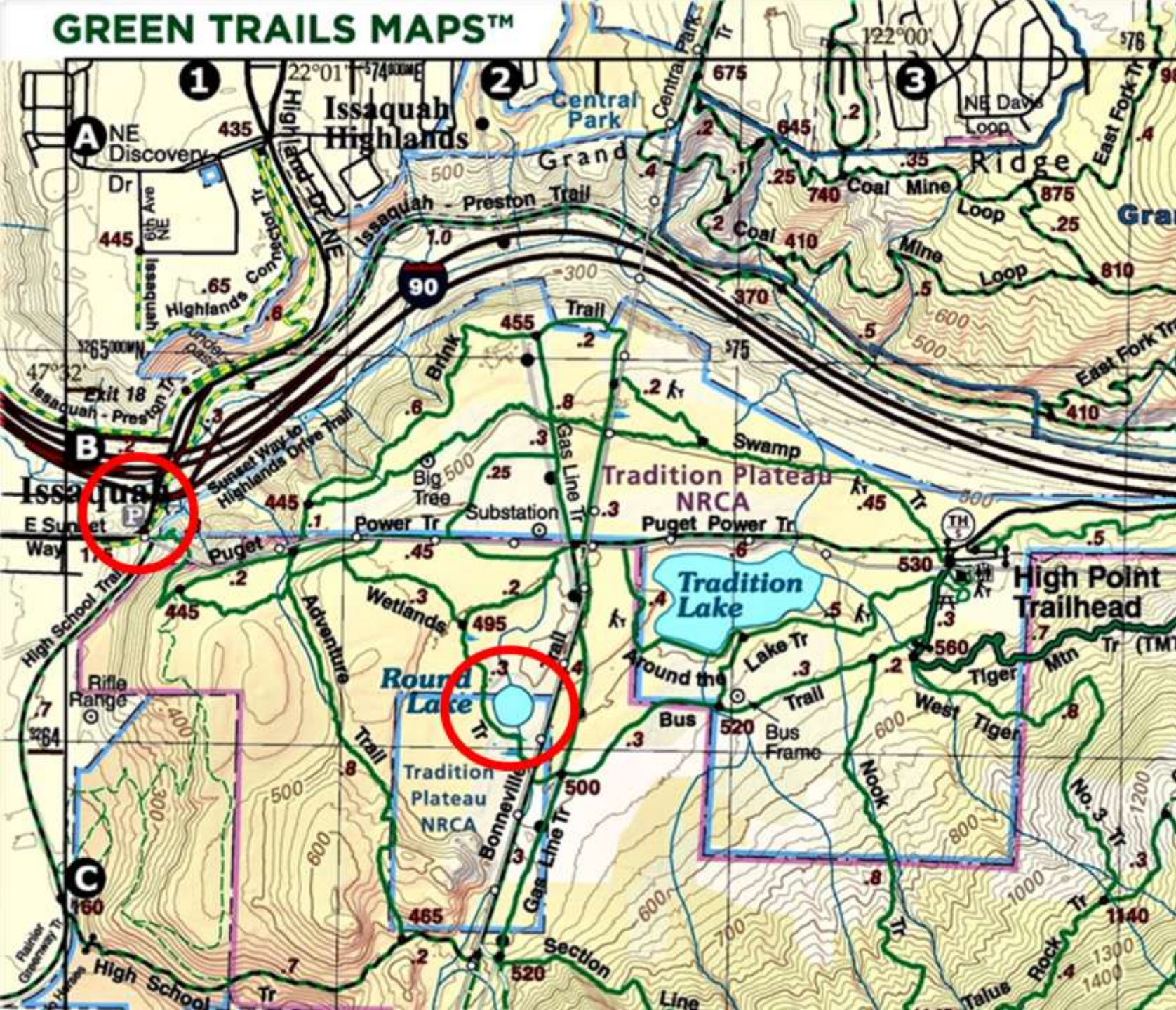
**Q19. What is the bearing (the number you read on the bezel) at the index mark?**

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

(There isn't a 'right' answer to this one – it depends on which object you pick!)







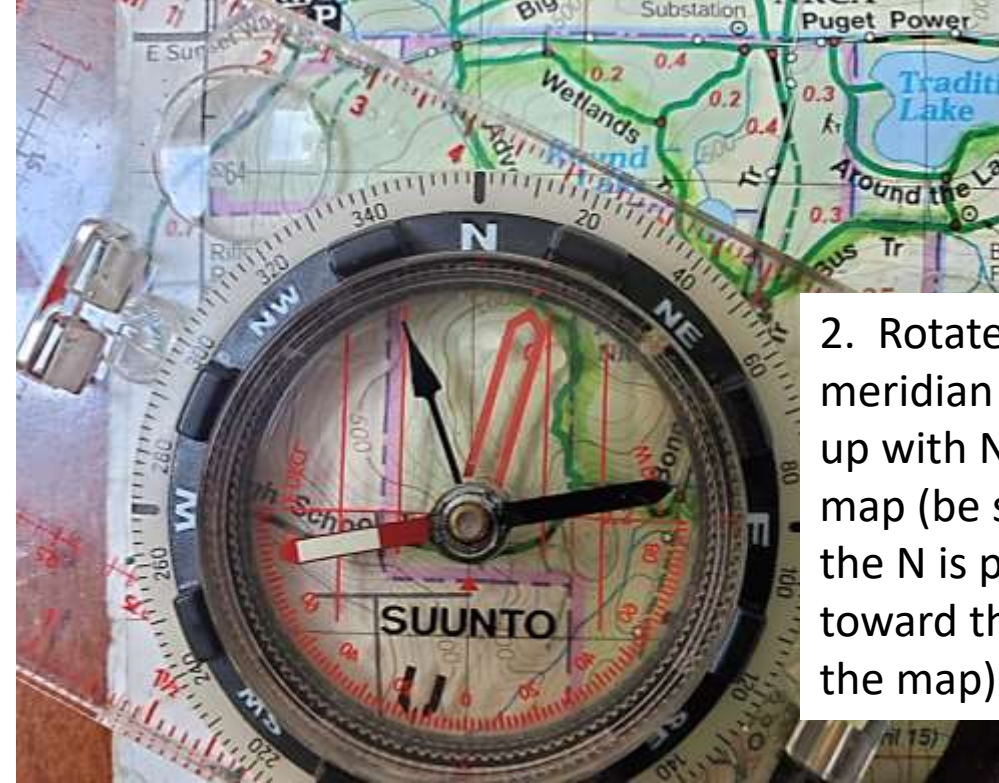
Now let's measure a bearing on the map

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)

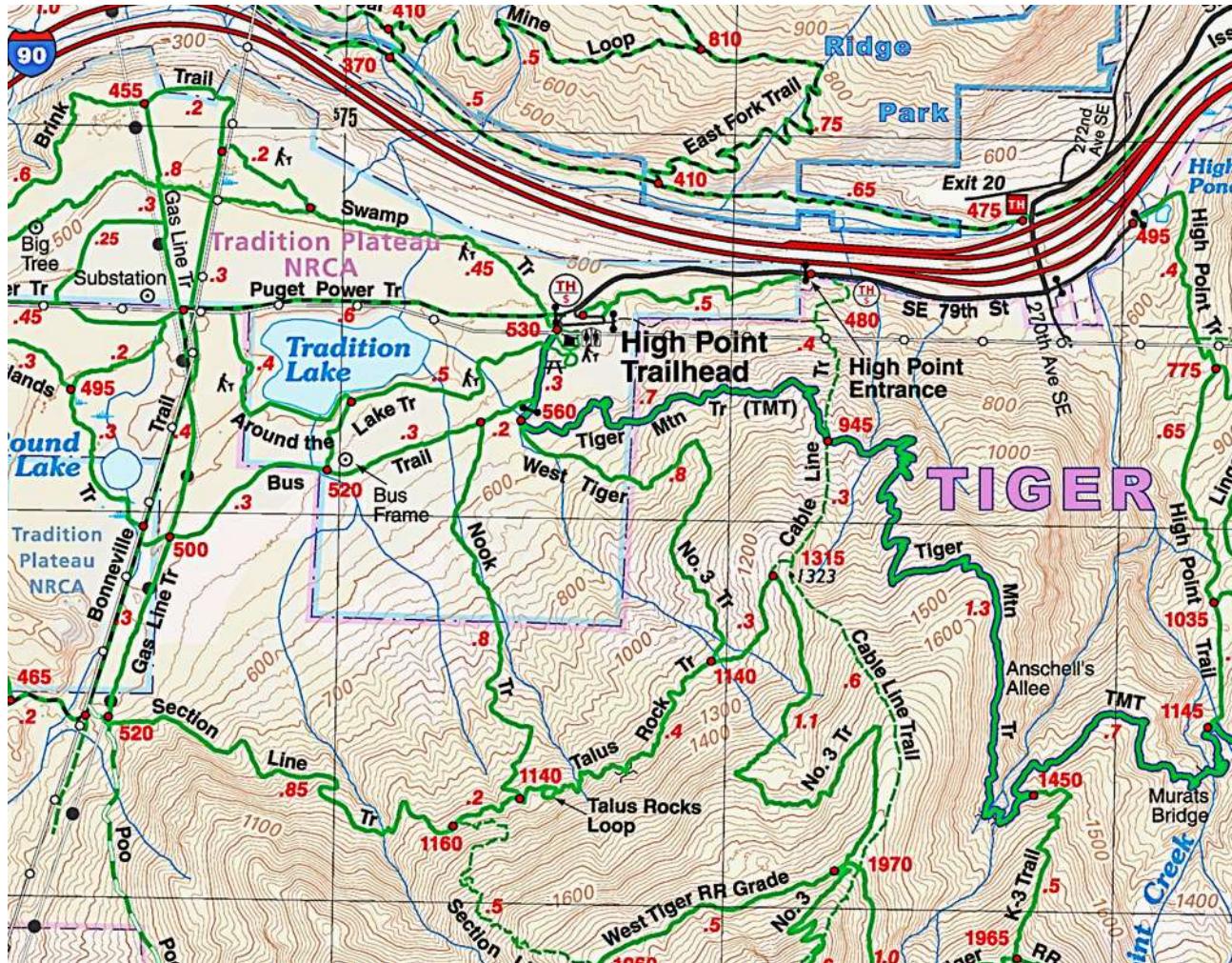
3. Read bearing at index mark

**Q20. 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.)

- **Q21. Based on your map, what cross-trail do you think it is?** Circle the junction. (Hint: use the section distances on your map!)
- **Q22.1. Without using your compass, estimate the bearing on your map that you want to follow from that junction to stay on the West Tiger 3 trail**
- **Q22.2. Now use your compass to check your estimate. What bearing did you measure? Is it close to your estimate?**



# Practice following that bearing.



The index mark on your compass is now set to the bearing you got in Q22 to stay on the West Tiger 3 trail.

**Holding the compass flat and square to your body, turn your body and the compass until the red magnetic arrow is boxed into the arrow-shaped box on your compass – this is called “putting red in the shed”!**



Keeping the compass flat and square to your body, walk forward while keeping ‘red in the shed’. This is ‘following a bearing’, in this case along the West Tiger 3 trail.



## Determine your walking pace

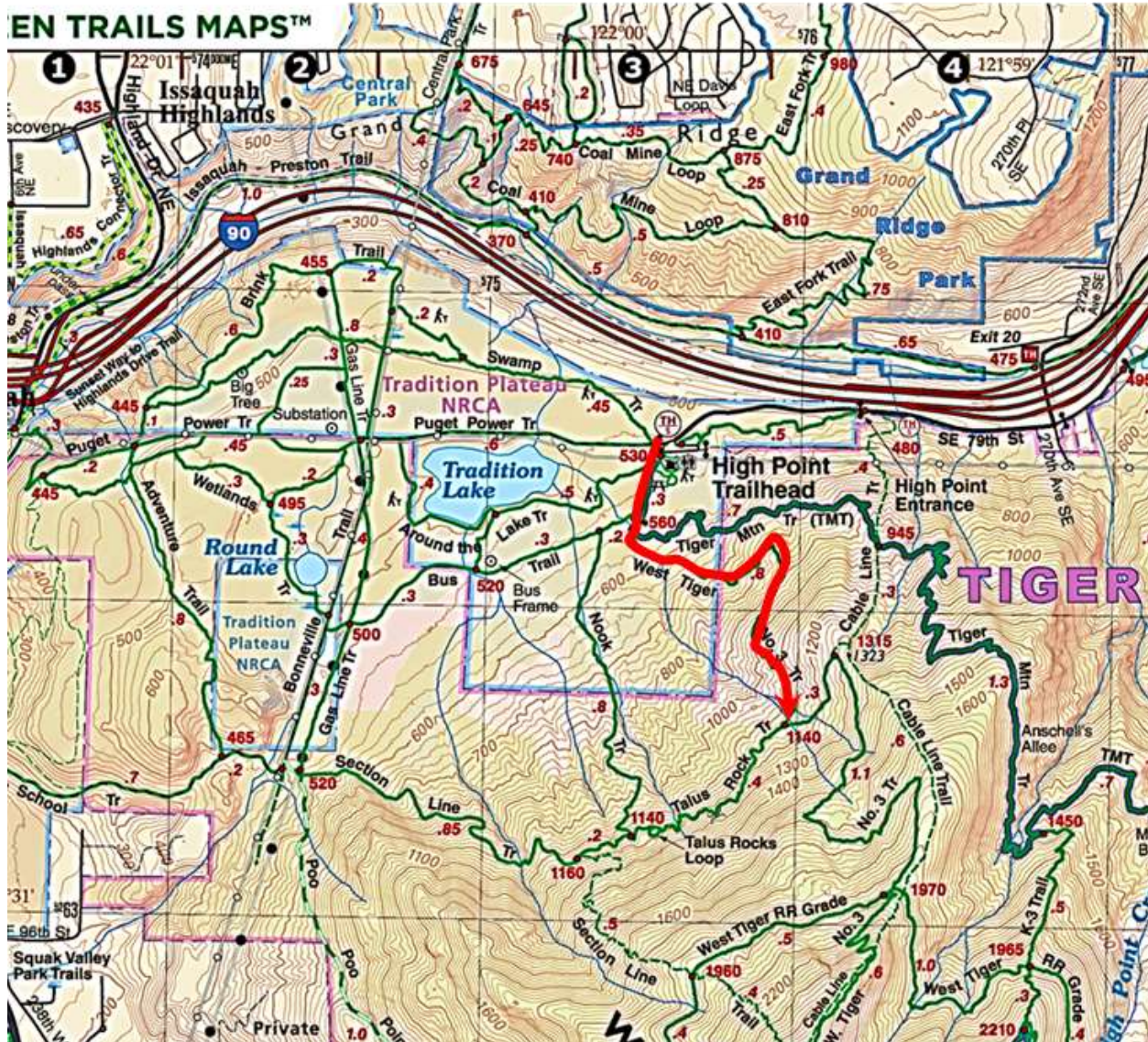
Use your watch to measure the time it takes you to walk a known distance along a trail or street near your house. Then divide the distance in miles by the time in hours to get your walking pace in miles per hour.

**Q23. 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!



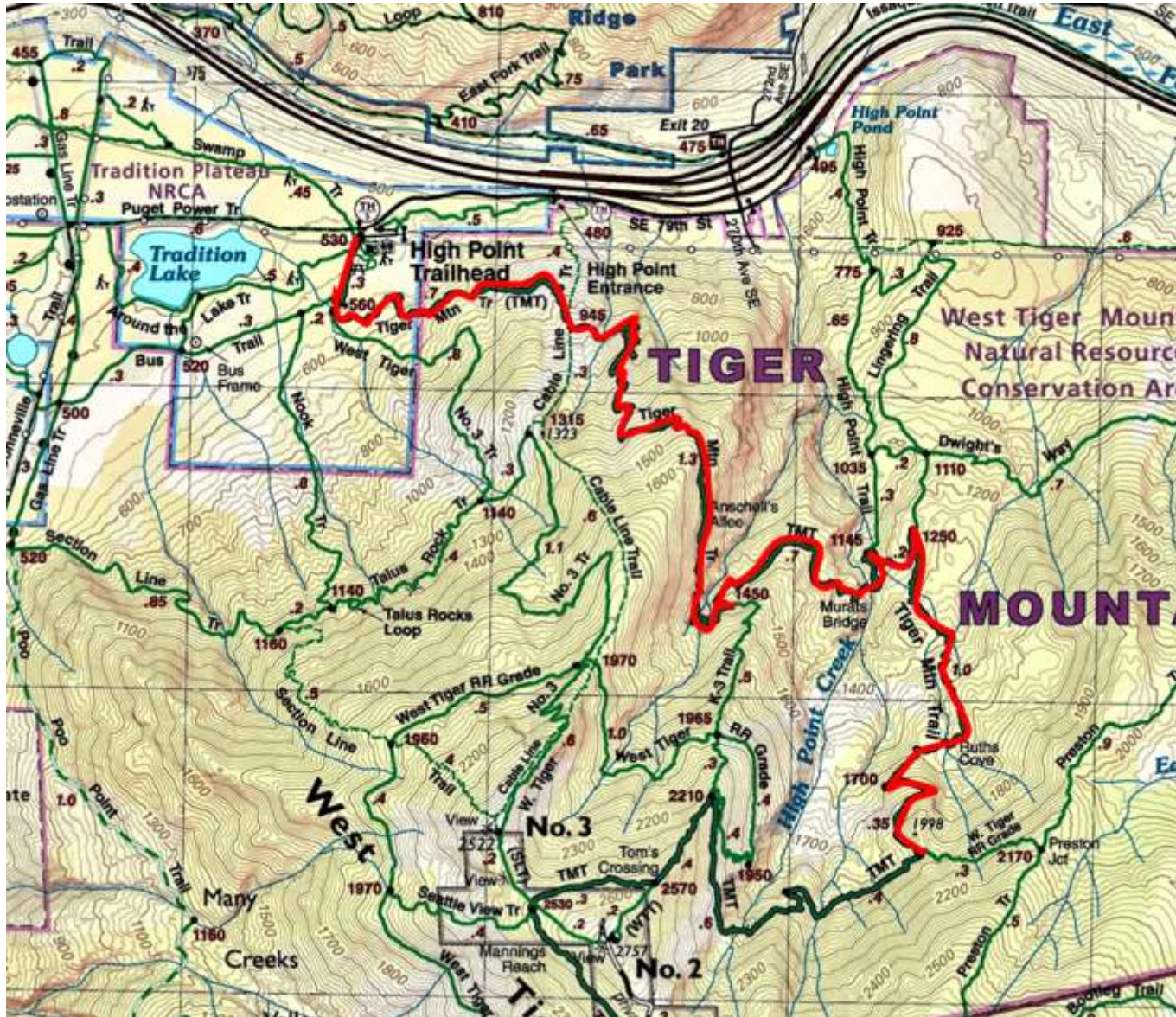
Say that you started up the West Tiger 3 trail from the High Point trailhead at 9AM. When you reached the Talus Rock Trail junction it read 9:30AM.

**Q24. 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.

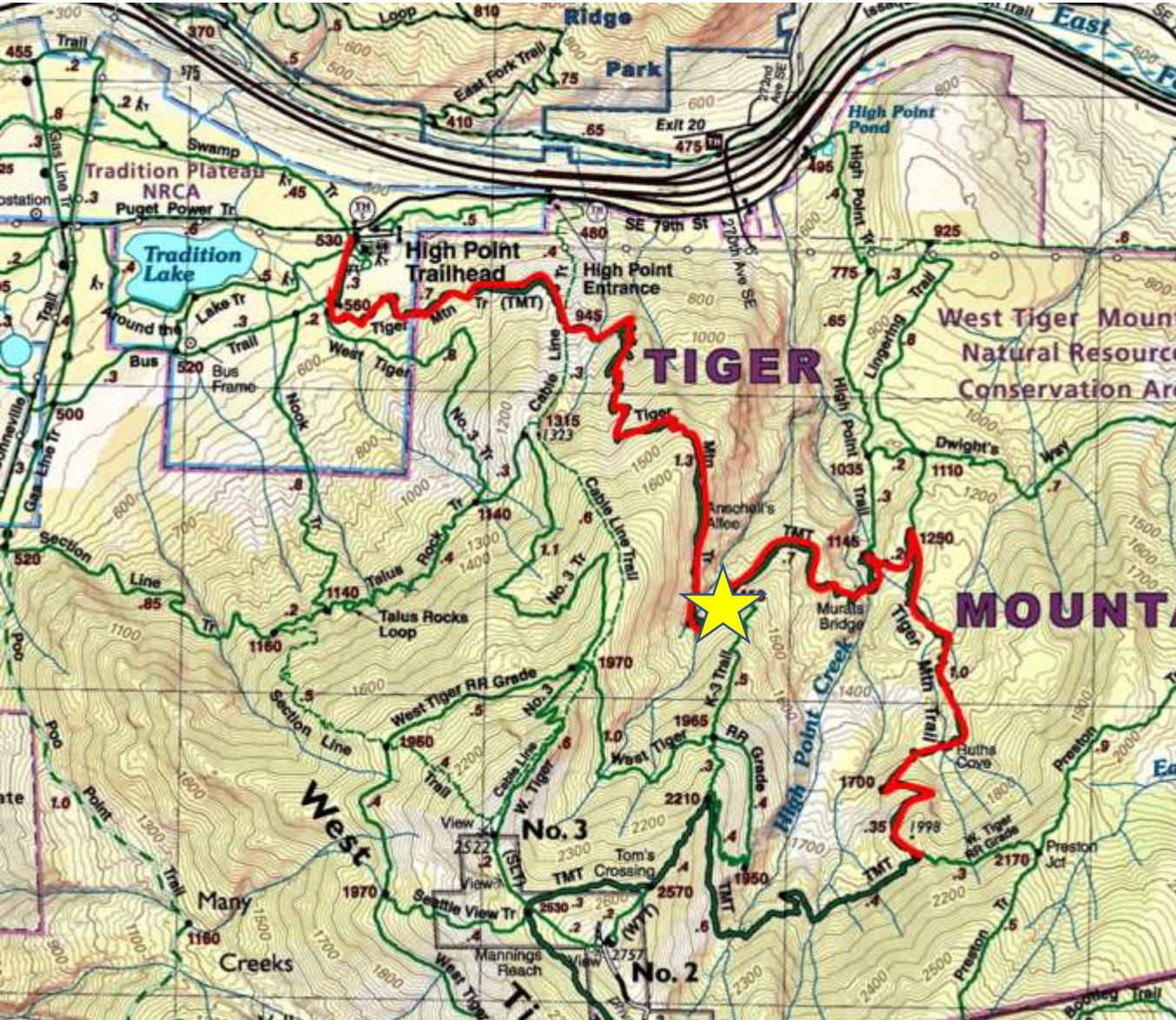
Say you have walked an hour at your normal walking pace (2 MPH) and wonder where you are. Your altimeter says your current elevation is 1500 feet.

**Q25. Circle where you think you are on the map!**

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? Which of those places is about an hour from the High Point TH?



### 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 at your normal walking pace (2 MPH) and come to an unmarked junction. Your altimeter says 1960 feet.

**Q26. From your map, what trail do you think you have reached?**

**Q27. If you are correct, what bearing would this trail be heading from your position based on the map?**

**Q28. What bearing would you want to be following from that position to stay on the TMT?**



# Preparing for the Staying Found Online Workshop, May 14 2024

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.