Chatham CERT

General Meeting
July 25, 2018

Agenda

- Introductions
  - Please fill out contact form with name, email, cell phone & cell provider, plus ham callsign if you have one
- Startup activities
  - Update on work so far
  - Outreach
- Gear
- Upcoming meetings
- First Responder Fatality
- Tonight's Class (presentation will be available online)

CERT Mission

The Chatham Community Emergency Response Team (CERT) delivers education and training for Chatham County residents on emergency and disaster preparedness, and when activated, supports, to the extent of their training, Chatham County emergency response under the direction of Chatham County Emergency Management officials and local incident commanders.

CERT Startup - Membership

Name and contact information

Background and any past training

Photo release

Background check release

[Click here for the application form]

CHATHAM CERT COMMUNITY EMERGENCY RESPONSE TEAM

Chatham County, NC
CERT Program
Membership Application

The following information is required – please print legibly!
When completed, turn in to an officer at any Chatham CERT meeting or submit to ChathamCERT@Outlook.com.

Full Name _____

Home Address _____

Mailing Address _____

Neighborhood / Subdivision _____

Email Address _____

Home Phone _____

Cell Phone _____

Cell Provider _____

HAM Callsign/ID _____

Emergency Contact Information

Name _____

Relationship _____

Phone _____

I am currently or was formerly:
- ☐ Military
- ☐ Medically Trained
- ☐ Fire Department
- ☐ Law Enforcement

FEMA Training ID _____

I have completed/taken the following:
- ☐ NC-317 CERT Basic Training Class (Classroom)
- ☐ IS-317 Introduction to CERT (Online)
- ☐ ICS-100 Introduction to the Incident Command System (ICS)
- ☐ ICS-200 ICS for Single Resources & Initial Action Incidents
- ☐ ICS-700 National Incident Management System (NIMS) An Introduction
- ☐ ICS-800 National Response Framework, an Introduction

List here skills you feel you will bring to Chatham CERT, other CERT programs you have participated in, or requirements for accommodations. If there is insufficient space here, indicate below and continue on the reverse.

☐ Continued on reverse

As a CERT member you may be asked to work in situations which expose you to confidential data and/or exposed to confidential data or property. If you do not wish to have a free background check performed, skip this section. A background check will be required for some duties and offices.

Driver License # _____ Date of Birth _____

I give permission for any still image (photography) or video footage in which I may appear to be used for whatever purpose is deemed appropriate. I do this voluntarily and with the understanding there is no remuneration. In addition, I release any involved agencies and/or jurisdictions from any liability related to my participation in CERT activities including training, deployment, or other CERT related activities. I hereby certify the information I have provided in this application is true and accurate to the best of my ability.

Signature _____ Date _____

CERT Membership Levels

- **CERT Associate Member**
  - Lives or works within Chatham County, *and*
  - Completes CERT Basic Training Class (NC-317), *and*
  - Has approved CERT vest, *and*
  - Attends at least 2 Chatham CERT events, training classes, or meetings per year.
- **CERT Team Member** (in addition to Associate Member requirements)
  - Has basic CERT deployment equipment, *and*
  - Passes a Chatham County CERT background check, *and*
  - Obtains First Aid / CPR / AED training, *and*
  - Completes FEMA training IS.100, IS.200, IS.700, and IS.800 training, *and*
  - Additional training as required for specific tasks, *and*
  - Attends at least 4 Chatham CERT events, training classes, or meetings per year.
- **CERT Emergency Responder** (in addition to Team Member requirements)
  - At least three additional focused training classes, *or*
  - Advanced first aid training, advanced SAR, HAM radio, veterinary response, or related training/certification to support to first responders

CERT Startup - Gear

- Standard vest for CERT participants: everyone buys their own ‘Deluxe CERT vest – fitted with pockets and reflective stripes’ for $13.88 from www.sosproducts.com

- Optional shirt and cap (can order)
  - Not required but nice items when dealing with the community

CERT Startup - Training & Meetings

- Recent
  - June meeting: Chatham County Shelter Operations
- Tonight
  - Map Reading and Grid Coordinates
- Upcoming
  - August 2018: SkyWarn weather spotter
  - September 2018: Ham Radio and Emergency Communications
  - October 2018: Shearon Harris emergency plans (tentative)
  - November 2018: Fire safety and winter preparedness
- CERT Basic Courses
  - CERT Basic Training Course - Sanford, NC 27330
    Aug 3, 4, 10, 11
  - CERT Basic Training Course - Apex, NC 27502
    Sep 14, 15, 16
  - TBD autumn 2018 in Chatham County

CHATHAM CERT COMMUNITY EMERGENCY RESPONSE TEAM

Questions?

Map Reading 101

'What Happens When My GPS Doesn't Work, or How I Learned to Love My Paper Maps'

Map Reading Objectives

- Understand a UTM Grid Coordinate
- Find a point on the ground
- How long will it take to get from one point to another?

Everyone needs a sample map and a piece of paper

Map & Compass or GPS?

Map & Compass

- Lightweight & inexpensive
- Does not need batteries
- Provides *much more* information than a GPS

But …

- You need skills to use correctly
- Without a map, a compass just shows you which way is north

GPS

- Gives exact location and altitude
- Easier to use when on the move

But …

- It's an electronic device, and needs batteries
- It needs a clear view of the GPS satellite constellation
- It does not give you the 'big picture'

What is a Map used for?

- Locate Places
- Represent features
- Convert a map distance into a ground distance
- Measure direction (bearing).
  - Angular distance is measured from 0º to 360º from North, clockwise.
- Measure elevations
  - Contour lines, spot heights, trig stations, benchmarks
- And much more!

Map Colors

- **Black**: cultural features: man-made objects, roads, buildings, surveyed elevations, labels
- **Red / Brown**: relief features and elevations, contour lines
- **Blue**: water features
- **Green**: vegetation
- **Red**: populated areas, main roads, boundaries (on older maps)
- **Other**: check the marginal information

Scales and Measuring

←Key Idea

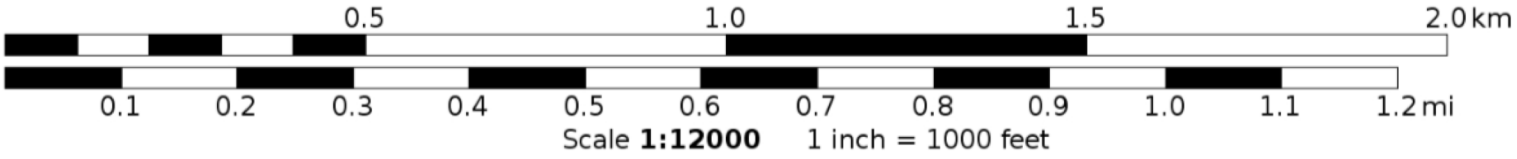
- Representative fraction (ratio) e.g., 1:12,000 on sample map
- Measure distance on map, convert to ground distance using formula

$$RF = \frac{1}{x} = \frac{MD}{GD}$$

Example: 5 inches, 1:12,000 → $\frac{1}{12000} = \frac{5"}{GD\ "}$ **or**

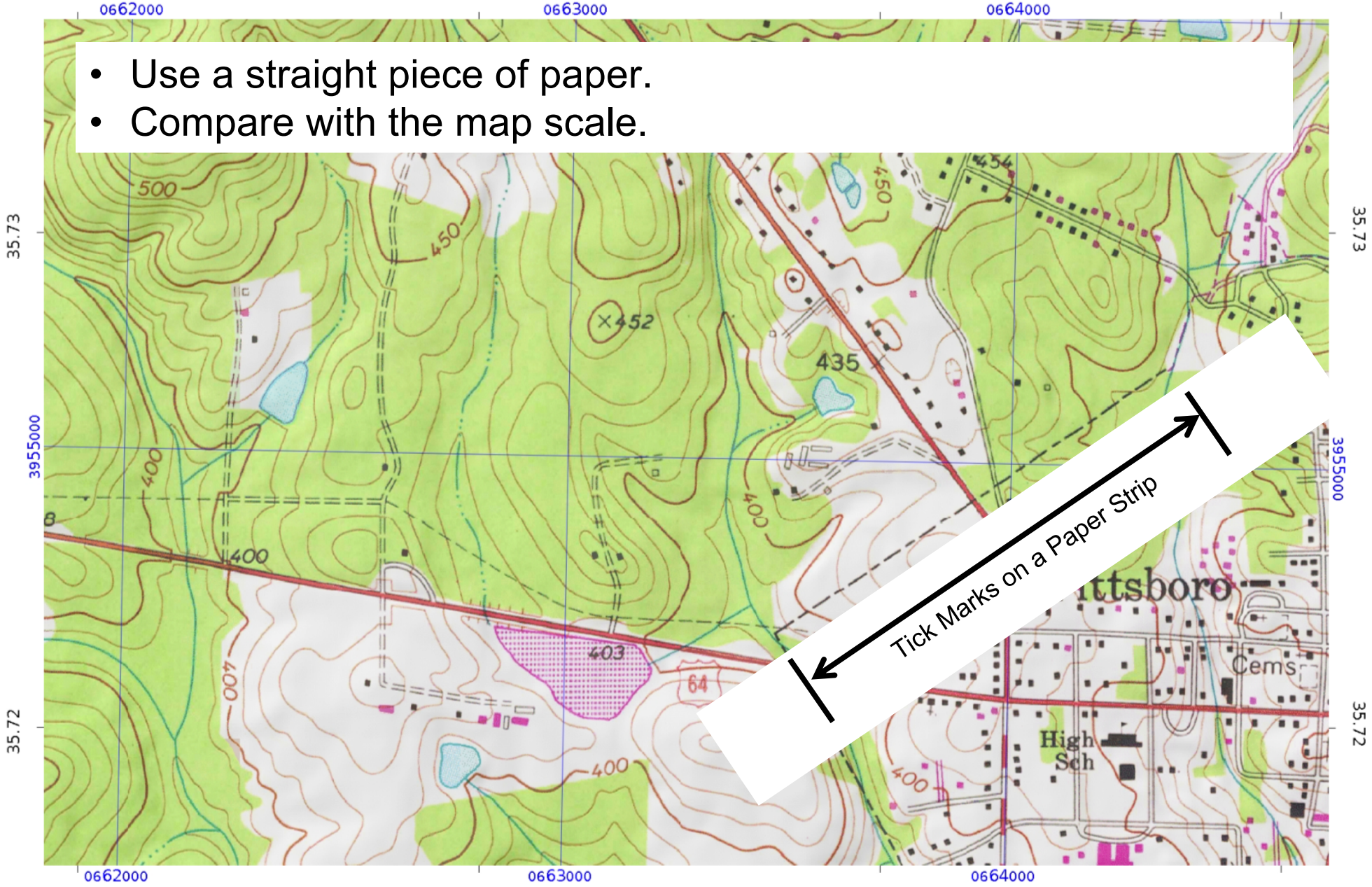
$GD = 60{,}000" = \frac{60000}{12} = 5{,}000\ ft$ (units must be the same!)

- Bar scale: converts map distance to ground distance



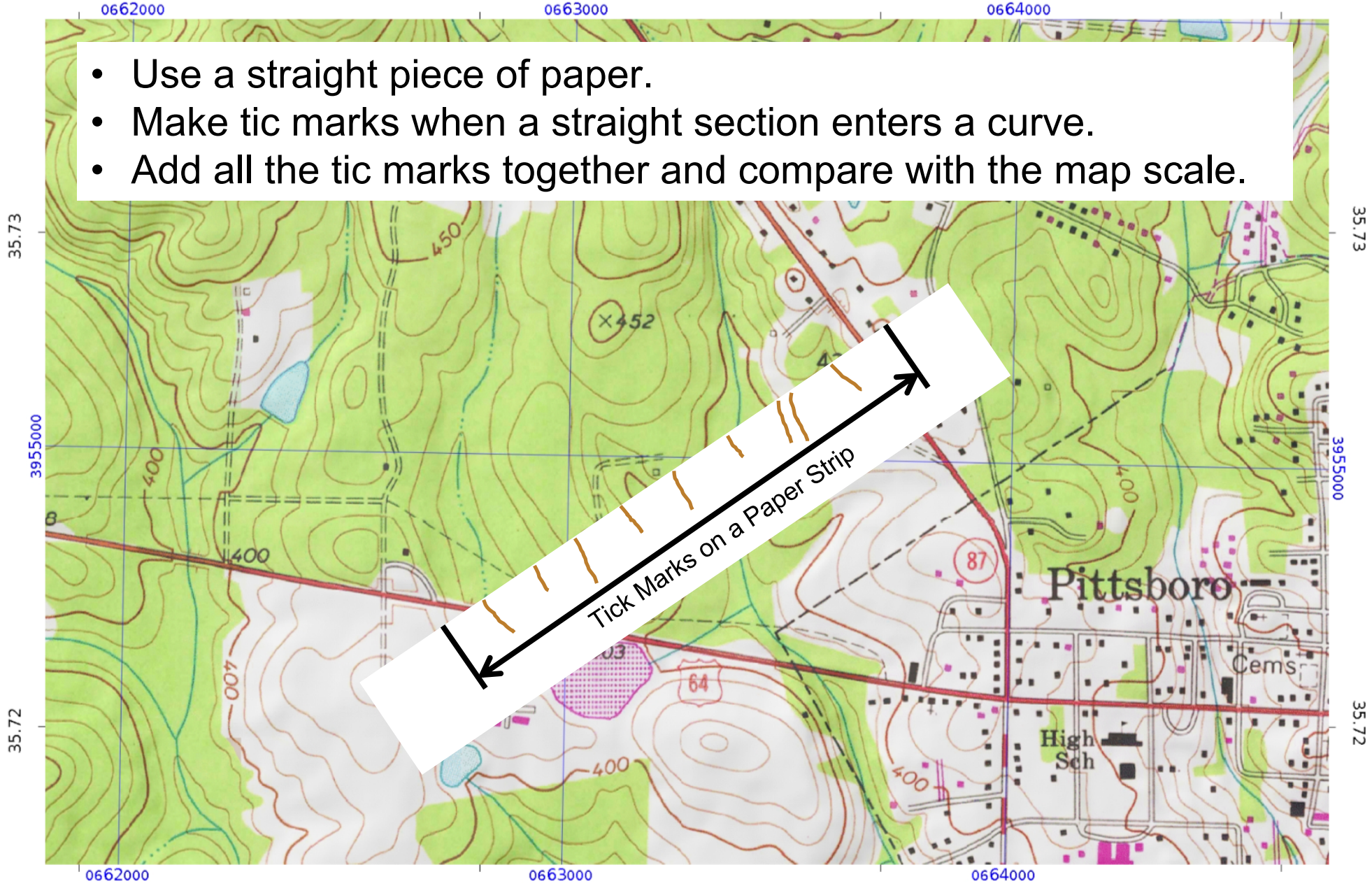
Measuring Straight Distance

- Use a straight piece of paper.
- Compare with the map scale.



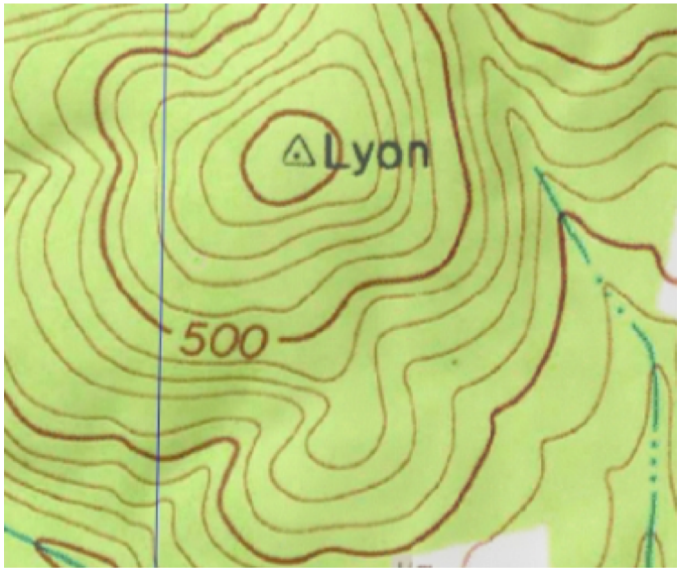
Measuring Curved Distance

- Use a straight piece of paper.
- Make tic marks when a straight section enters a curve.
- Add all the tic marks together and compare with the map scale.



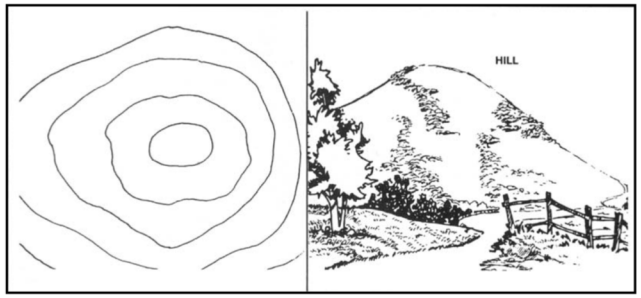
Contours

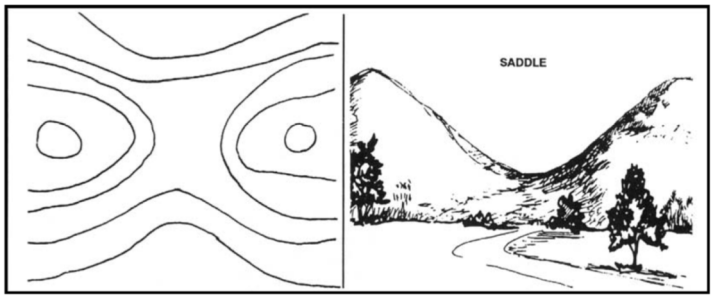
- Contour Line: An imaginary line on the ground, where all points have the same elevation. Every contour line (eventually) forms a circle.
- Index Contour: Every fifth contour is a heavier line, known as an index contour; they are normally numbered with the elevation of the line.
- Intermediate Contours: Normally four contours falling between index contours; elevation not given.
- Contour Interval: Difference between one Index Contour and the Next.
- ***The closer the lines, the steeper the terrain***.
- Information is found in the Map Legend.

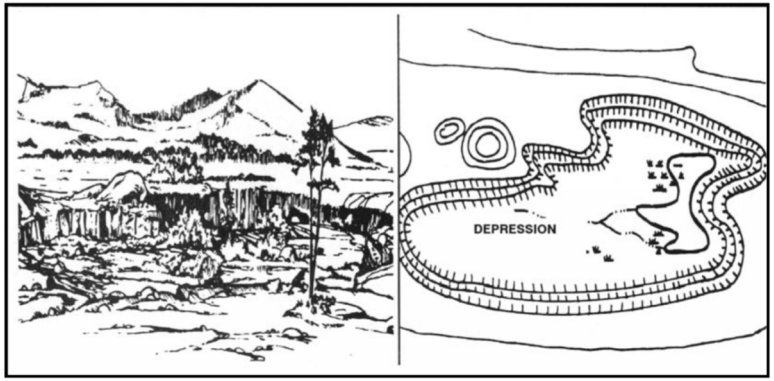


Terrain Features

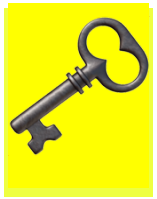
- Hills: Ground slopes down in all directions.
- Valley: Groove in the land, higher on three sides.
- Saddles: Low point between two areas of higher ground.
- Ridge: Sloping line of high ground.
- Depression: Low point in the ground, or a sinkhole.
- Cliff: Vertical or near-vertical feature; an abrupt change in the land.





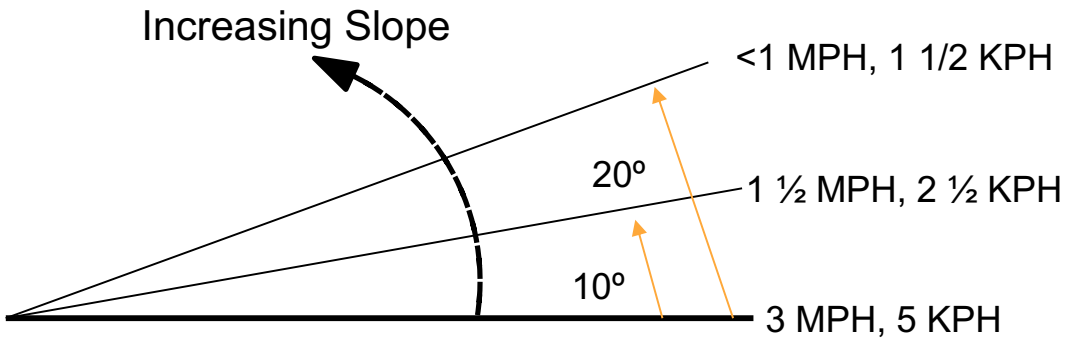


How fast can I travel?



It varies by individual, but a good rule of thumb:

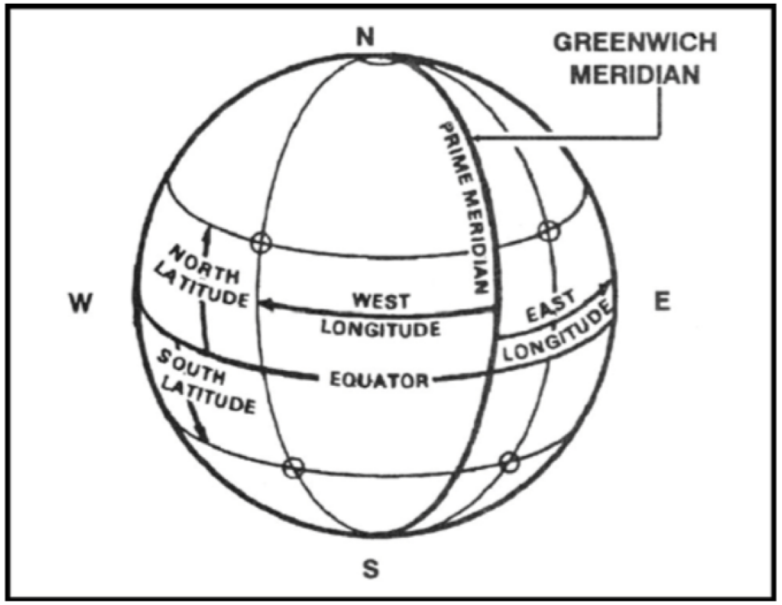
- Walking speed on level cleared road: about 3 MPH or about KPH
- Slope or cross-country greatly decreases speed



Computed using Tobler's Hiking Function

Latitude & Longitude

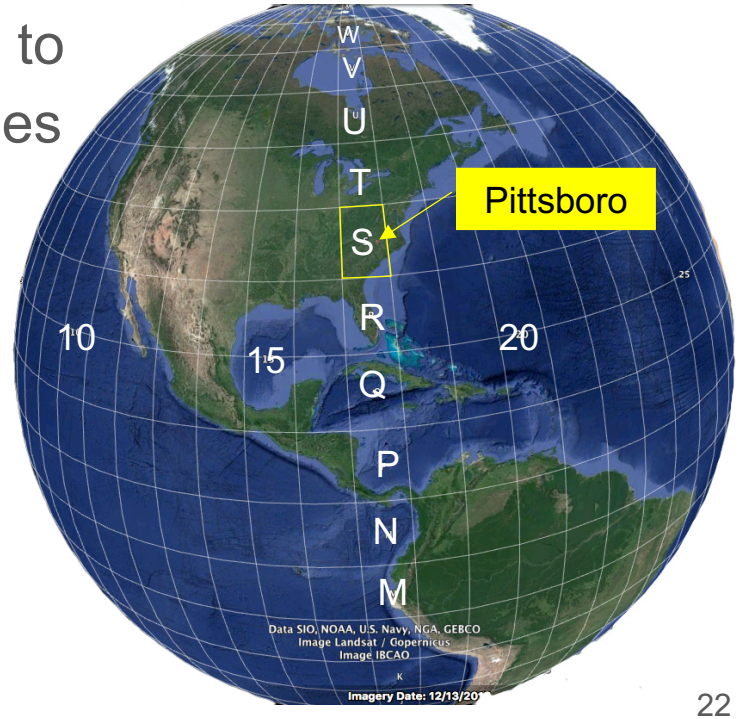
- **Latitude**: the distance of point N or S of equator. Latitude lines are parallel running north and south.
- **Longitude**: the distance from prime meridian (Greenwich England), known as meridians.
- Coordinates are expressed in angles. A circle has 360º; each degree is 60 minutes; each minute 60 seconds. 0º starts at the equator going north or south until 90º. Lines east of Prime Meridian are 0º to 180º east, likewise going west. E or W must be given.
- Lat / Lon is used a lot, but not useful for ground operations. (Why? The distance of a degree changes the farther from the equator and it is difficult to determine relative ground distances.)



Universal Transverse Mercator - UTM

THE EARTH ISN'T FLAT

- UTM grids cover between 84ºN and 80ºS, imposed on a Transverse Mercator projection and divide the Earth into Zones.
- **Easting**: Numbered 1– 60, starting at international date line (longitude 180º) and proceeding eastward.
- **Northing**: 20 letters, starting near South Pole and going North
- The Intersection of Numbers and Letters is the *Grid Reference*
- These zones are too large to be applicable to what we do on the ground (roughly 600 miles wide by 1200 miles tall in US)
- Doesn't work at North and South Poles

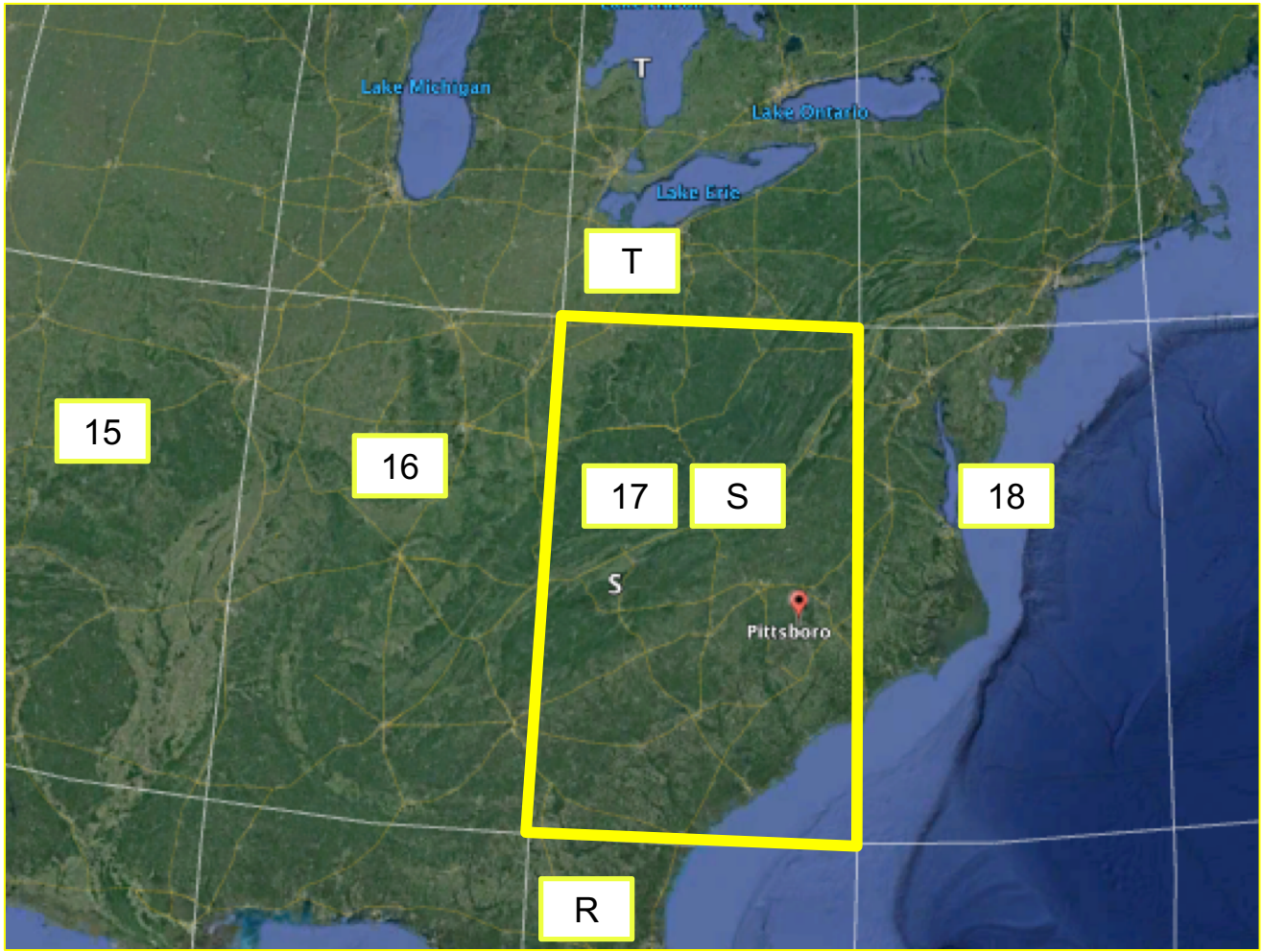


Transverse Mercator
Peel orange evenly into sixty segments called "zones".
Flatten each one of these zones.
What's the result?
It's a Universal Transverse Mercator (UTM) projection!

UTM Zone 17S

Most of North Carolina is in UTM Grid Zone 17 S

'S' does not mean South!



UTM Zone 17S

Coordinates are determined by:

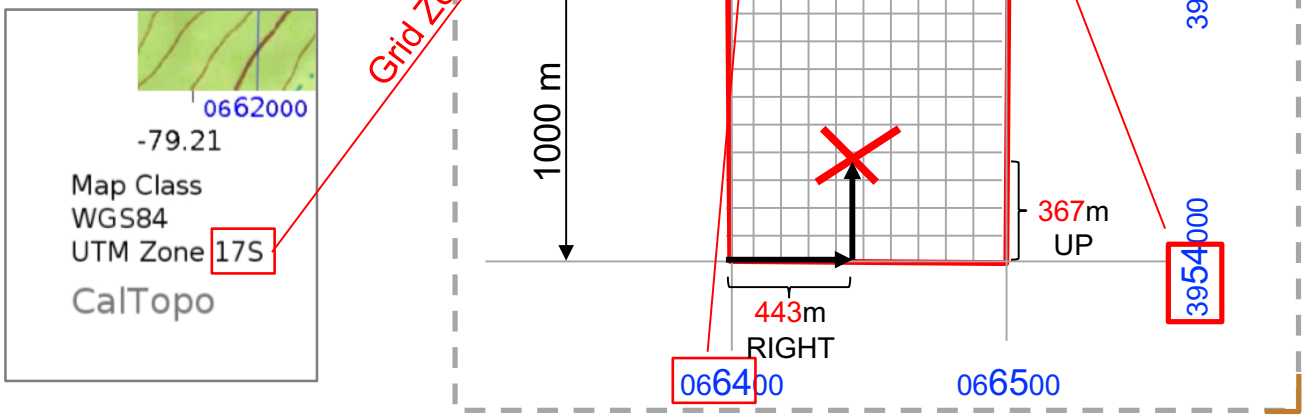
- **Easting** – in meters measured from the centerline of the Zone (500,000 m)
- **Northing** – in meters from the Equator

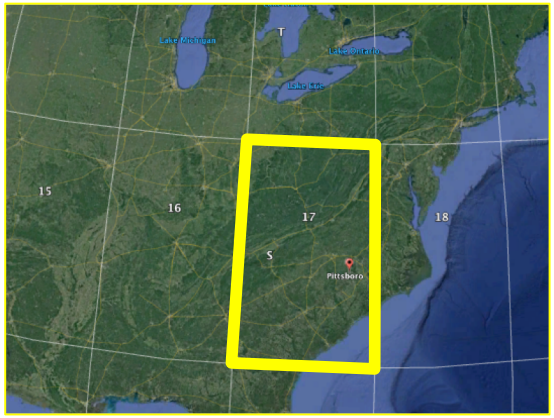
By Convention: 500,000 meters at Centerline of 17S

Northing: Measure in meters North from Equator

UTM Grid Location

- UTM Grids are divided into 1,000 x 1,000 meter squares
- Mentally divide the grid square into tenths, locating the point to the nearest 100 meters using estimation. Determine grids by reading RIGHT then UP.
- Example: EOC is at 17S 664443 3954367





3954367 meters = 2457.13 miles N of Equator

664,443 meters = 102 miles right of center of grid zone designator

Converting from Lat/Lon to UTM

- Don’t try this at home – use an app on your phone

$$E = E_0 + k_0 A \left(\eta' + \sum_{j=1}^{3} \alpha_j \cos(2j\xi') \sinh(2j\eta') \right),$$

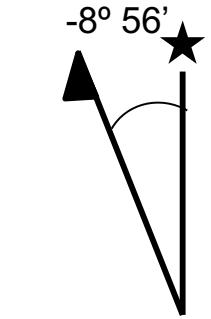
$$N = N_0 + k_0 A \left(\xi' + \sum_{j=1}^{3} \alpha_j \sin(2j\xi') \cosh(2j\eta') \right),$$

$$k = \frac{k_0 A}{a} \sqrt{\left\{ 1 + \left(\frac{1-n}{1+n} \tan\varphi \right)^2 \right\} \frac{\sigma^2 + \tau^2}{t^2 + \cos^2(\lambda - \lambda_0)}},$$

$$\gamma = \tan^{-1} \left(\frac{\tau\sqrt{1+t^2} + \sigma t \tan(\lambda - \lambda_0)}{\sigma\sqrt{1+t^2} - \tau t \tan(\lambda - \lambda_0)} \right).$$

Three Norths

- **True North**: A line from any point on the earth's surface to the North Pole. Usually symbolized by a Star on the Compass Rose.
- **Magnetic North**: The direction to the magnetic North Pole, indicated by the north-seeking needle of a compass.
  Usually indicated by a half-arrow on the Compass Rose.
  - Across Chatham County declination is roughly -9º, and moving 3' West each year.
  - Nag's Head -11º, Asheville is -6º 42'.
- **Grid North**: North established by the vertical grid lines on a map, and always parallel to the Prime Meridian.



Declination at EOC

- These are close, but *not close enough. Declination* is the angle between True and Magnetic North for a given location.
- Orient your map – turn so North on the map shows North on the ground

Grid and Magnetic Conversions

Conversions (Declination is positive to right, negative to left)

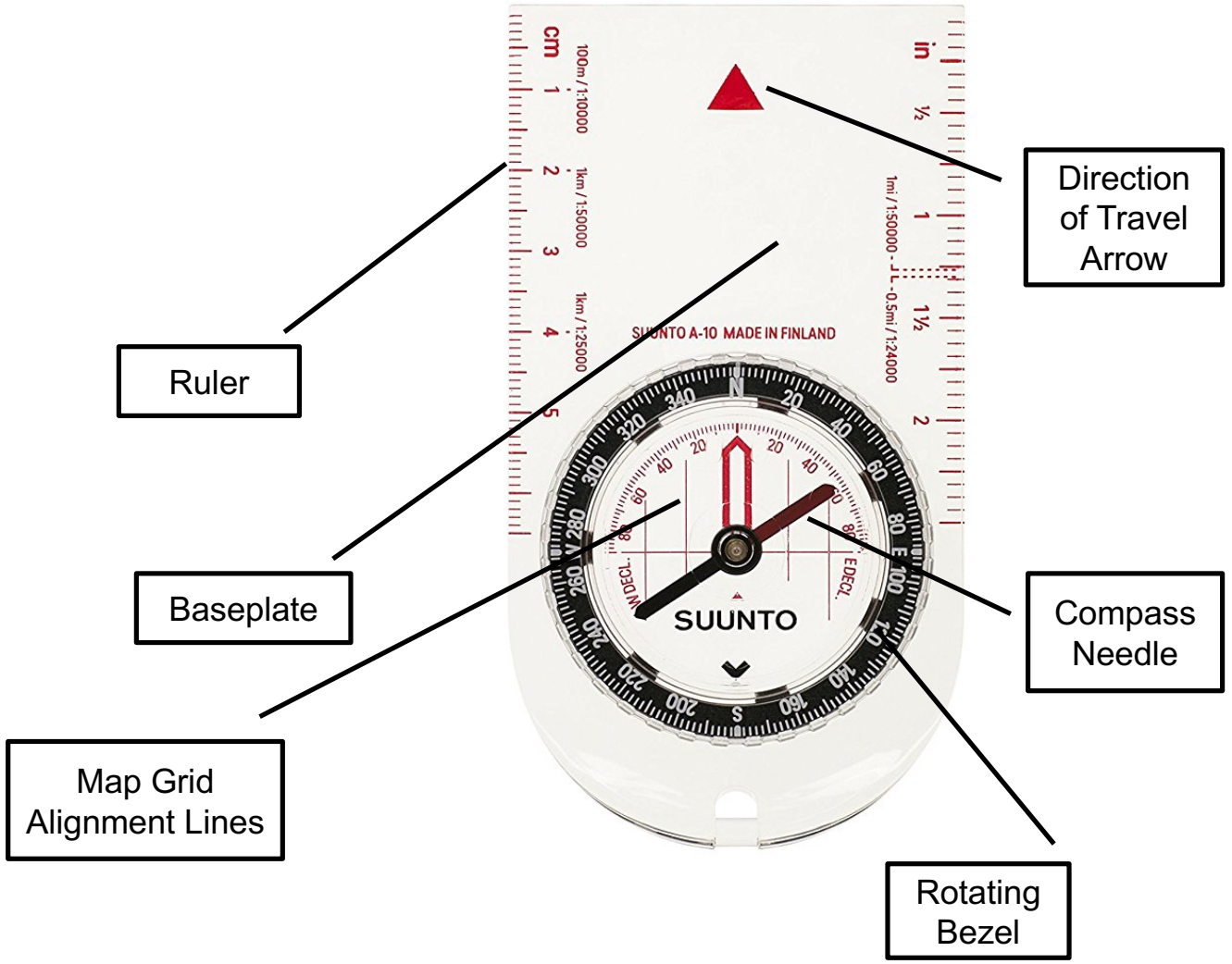
- For Compass to Map: Grid = Magnetic North + Declination (in degrees)
- For Map to Compass: Magnetic = Grid – Declination
- Remember Pittsboro has a *negative* declination.

Problems

- **Is my compass set for true, grid, or magnetic bearings?** I don't remember.
- **Is is my compass set for the declination here, or somewhere else?** I don't know.
- **Is my compass set correctly?** I don't know how to check it, or how to adjust it.

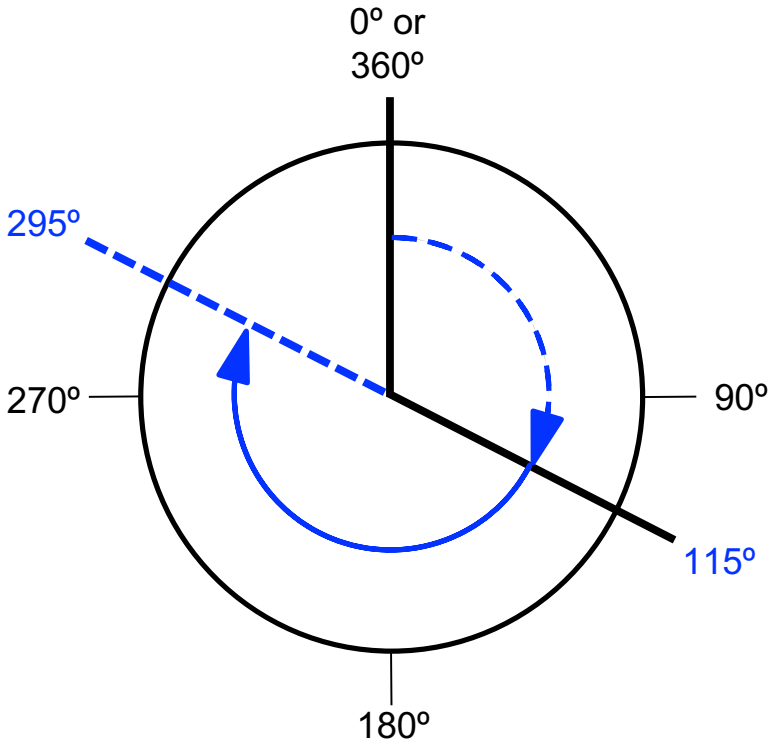
Compasses and Magnetic North

- Compass cost: $15 on up



Azimuth

- ***Azimuth***: Horizontal angle measured from a north base line.
- ***Back Azimuth***: Opposite of the Azimuth - an 'about face' - add or subtract 180 degrees from the azimuth.

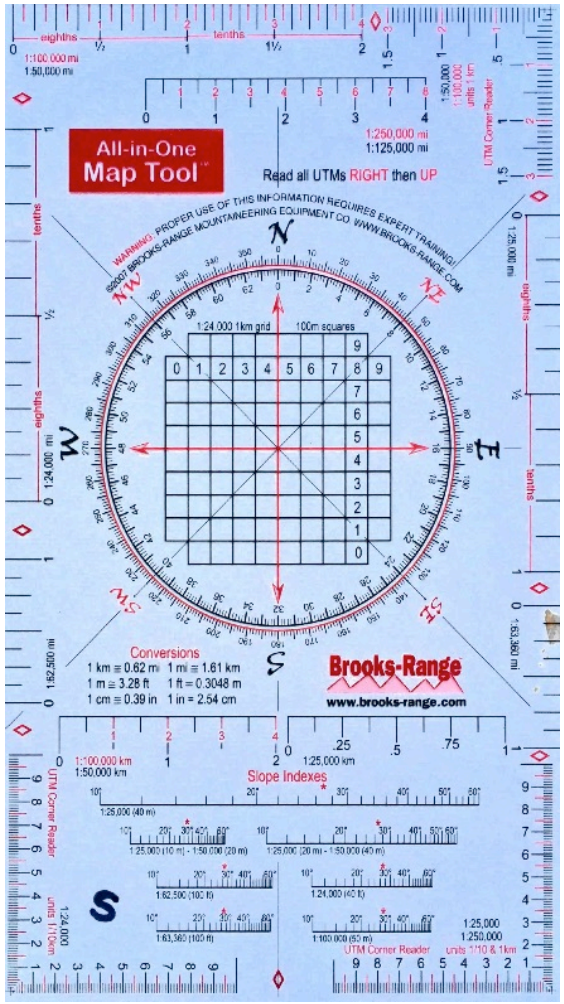


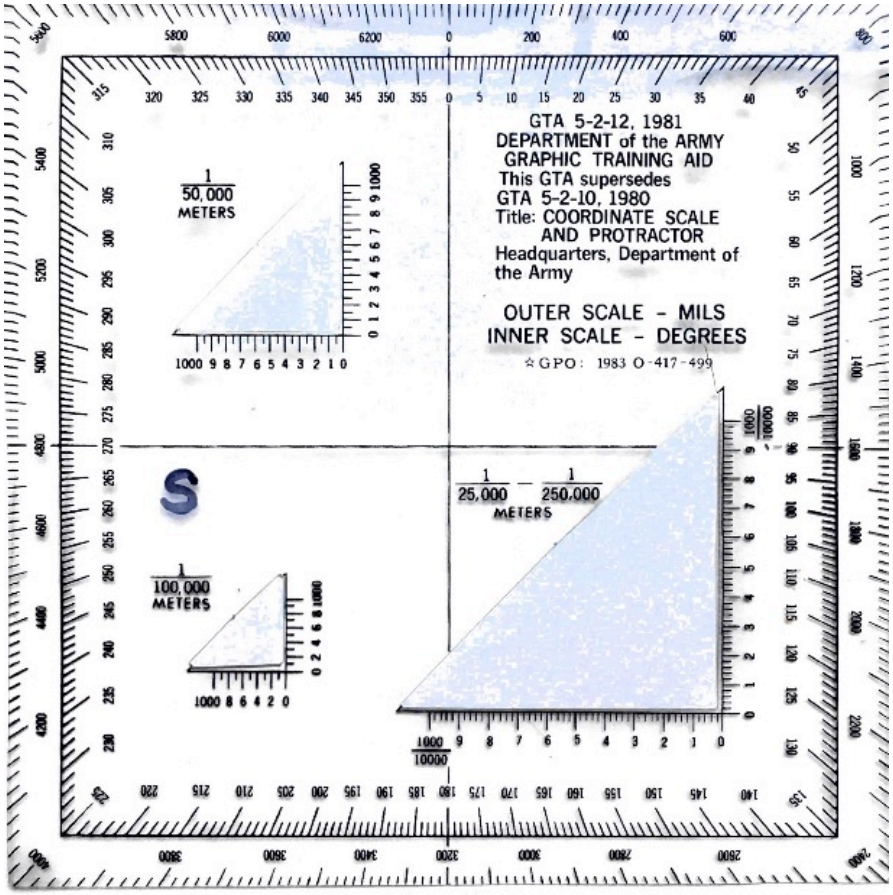
Example:

Azimuth	±	Back Azimuth
115º	+180º	= 295º
337º	-180º	= 157º

Useful Map Tools

- Map Protractors – several kinds available

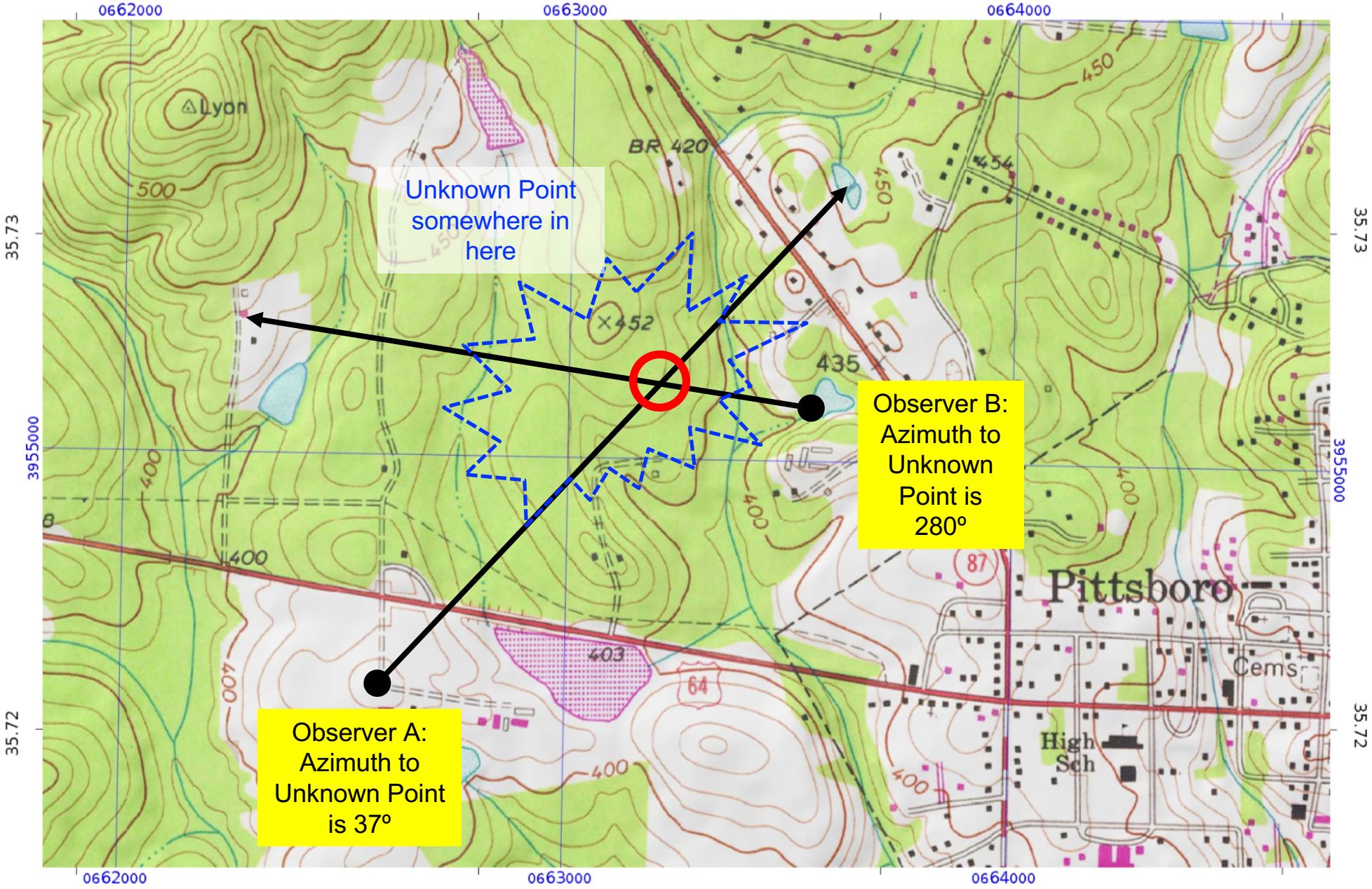




Intersection – Where is *that*?

- **Intersection**. Location of an unknown point by sighting from two (or three) known locations to the unknown location.
  - Orient your map so map grids run North and South, using a compass.
  - Locate and mark your position on the map.
  - Determine the magnetic azimuth to the unknown point. Convert to a grid azimuth and mark on the map.
  - Do the same from a second known point and mark on the map.
  - The crossing point is the unknown location.

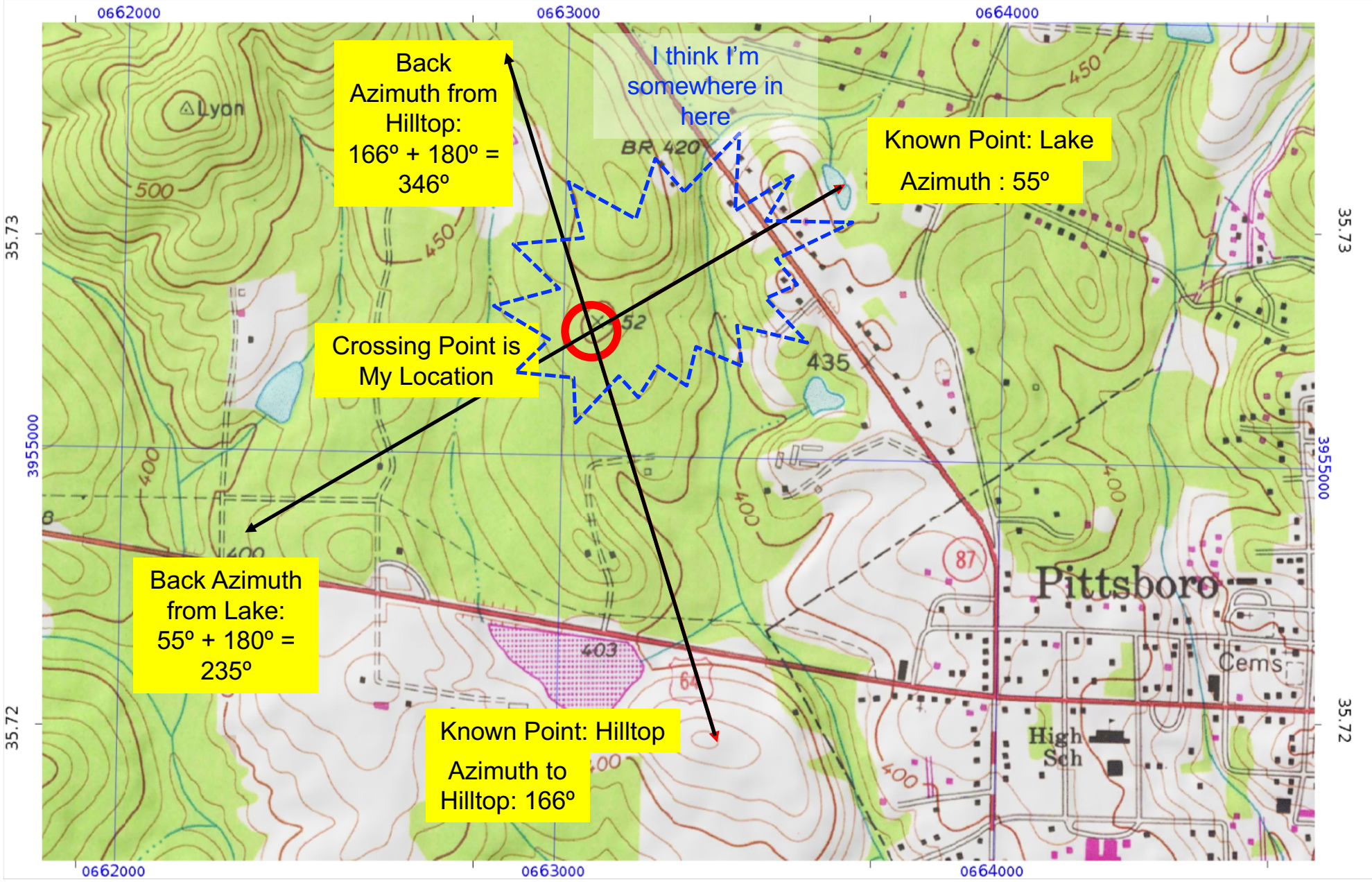
Intersection Example



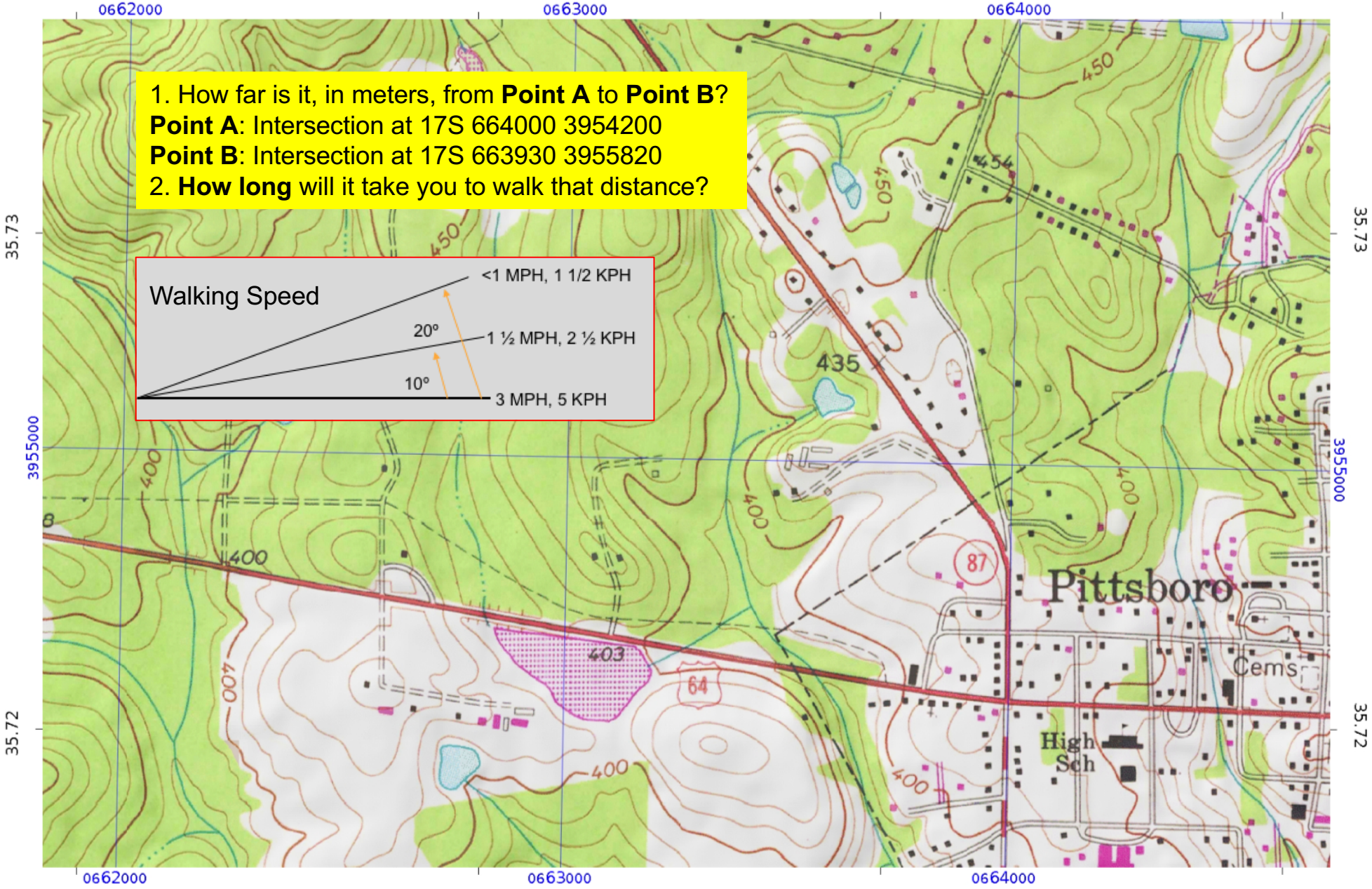
Resection – where am *I*?

- **Resection**. This is the opposite of Intersection; finding your position based on at least two well-defined locations pinpointed on a map.
  - Orient the map so map grids run North and South, using your compass.
  - Identify two or three known distant locations on the ground and mark them on your map.
  - Measure the magnetic azimuth from one of the known positions from your location using a compass.
  - Convert the magnetic azimuth to a grid azimuth.
  - Convert the grid azimuth to a back azimuth. Draw a line for the back azimuth on the map to the known position back to your unknown position.
  - Additional readings give more accuracy.

Resection Example



Practical Exercise

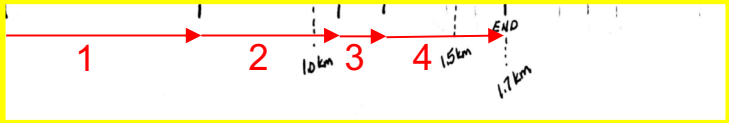


Practical Exercise

CHATHAM CERT COMMUNITY EMERGENCY RESPONSE TEAM

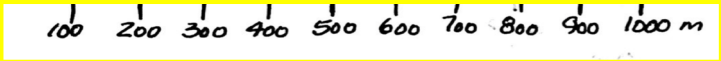
1. How far is it, in meters, from Point A to Point B?
Point A: Intersection at 17S 664000 3954200
Point B: Intersection at 17S 663930 3955820
2. How long will it take you to walk that distance?

1. How Far is it?
Break into sections and add together:
1,700m or 1.7 km



2. How long to walk that distance?
At 5 kilometers / hour walking speed,
1.7 km 5 = 0.34 hour, or **a little over 20 minutes**

Make a little ruler using the Legend



Point B: 17S 663930 3955820

Point A: 17S 664000 3954200

References

- Sources for maps:
  - mappingsupport.com (online maps)
  - caltopo.com (online maps)
  - www.mytopo.com (good site for printed Maps)
  - Google Earth (good for images, distances, locations)
- Find your magnetic declination
  - http://www.magnetic-declination.com
- iPhone Apps
  - MotionX-GPS, Pocket Earth, UTM
- More Information
  - FM 3-25.26 Map Reading and Land Navigation
  - http://nconemap.gov
  - https://maptools.com/tutorials/utm/quick_guide

Questions?

- This is not a comprehensive map reading class
  - It's takes thinking through the examples, and
  - PRACTICE!

- CERT will schedule an outdoor practice event in the future.

Conversion Factors

The Truth (to within 3 or 4 significant digits)		What you can remember (You'll be about 10% too short.)	
1 meter	= 3.280 feet = 1.094 yards	1 meter	~= 3 feet ~= 1 yard
100 m	= 109 yards	100 m	~= 100 yards ~= length of a football field
1000 m	= 1 kilometer = 1 km = 0.621 miles ~= 5/8 mile	1000 m	~= 1/2 mile

http://ngmsar.org/wp-content/uploads/2011/03/A-Quick-Guide-to-Using-UTM-Coordinates.pdf

ONE	INCHES	FEET	YARDS	STATUTE MILES	NAUTICLE MILES	mm
Inch	1	0.0833	0.0277	-	-	25.40
Foot	12	1	0.333	-	-	304.8
Yard	36	3	1	0.00056	-	914.4
Statute Mile	63,360	5,280	1,760	1	0.8684	-
Nautical Mile	72,963	6,080	2,026	1.1516	1	-
Millimeter	0.0394	0.0033	0.0011	-	-	1
Centimeter	0.3937	0.0328	0.0109	-	-	10
Decimeter	3.937	0.328	0.1093	-	-	100
Meter	39.37	3.2808	1.0936	0.0006	0.0005	1,000
Decameter	393.7	32.81	10.94	0.0062	0.0054	10,000
Hectometer	3,937	328.1	109.4	0.0621	0.0539	100,000
Kilometer	39,370	3,281	1,094	0.6214	0.5396	1,000,000
Myriameter	393,700	32,808	10,936	6.2137	5.3959	10,000,000

ONE	cm	dm	M	dkm	hm	km	mym
Inch	2.540	0.2540	0.0254	0.0025	0.0003	-	-
Foot	30.48	3.048	0.3048	0.0305	0.0030	0.0003	-
Yard	91.44	9.144	0.9144	0.0914	0.0091	0.0009	-
Statute Mile	160,930	16,093	1,609	160.9	16.09	1.6093	0.1609
Nautical Mile	185,325	18,532	1,853	185.3	18.53	1.8532	0.1853
Millimeter	0.1	0.01	0.001	0.0001	-	-	-
Centimeter	1	0.1	0.01	0.001	0.0001	-	-
Decimeter	10	1	0.1	0.01	0.001	0.0001	-
Meter	100	1	1	0.1	0.01	0.001	0.0001
Decameter	1,000	10	10	1	0.1	0.01	0.001
Hectometer	10,000	100	100	10	1	0.1	0.01
Kilometer	100,000	1,000	1,000	100	10	1	0.1
Myriameter	1,000,000	10,000	10,000	1000	100	10	1

Folding a Map