

A photograph of several Marines in camouflage uniforms and bucket hats standing in a forest during a rainstorm. The focus is on a Marine in the foreground who is looking to the right. A semi-transparent grey box is overlaid on the center of the image, containing the text 'Land Navigation'. The background shows other Marines and dense green foliage. The image is framed by green geometric shapes on the left and right sides.

Land Navigation

Recruits. Parris Island, South Carolina. 2019.

A soldier in camouflage gear is shown in a forest setting, looking intently at a map. The background is a blurred forest with green foliage. The soldier is wearing a camouflage hat and a tactical vest. The map is held in his hands, and a water bottle is visible on his vest. The overall scene is outdoors and appears to be a training exercise or a field operation.

OVERVIEW

- Information Contained on a Map
- Map Colors
- Contour Lines
- Measuring Distance
- Locate Position
- Lensatic Compass
- Orientation of the Map

A soldier in camouflage gear is shown in profile, looking towards the right. He is wearing a bucket hat and has a tactical vest with a water bottle. The background is a blurred forest. A semi-transparent grey box is overlaid on the center of the image, containing white text. The right side of the image features a green geometric graphic with overlapping shapes.

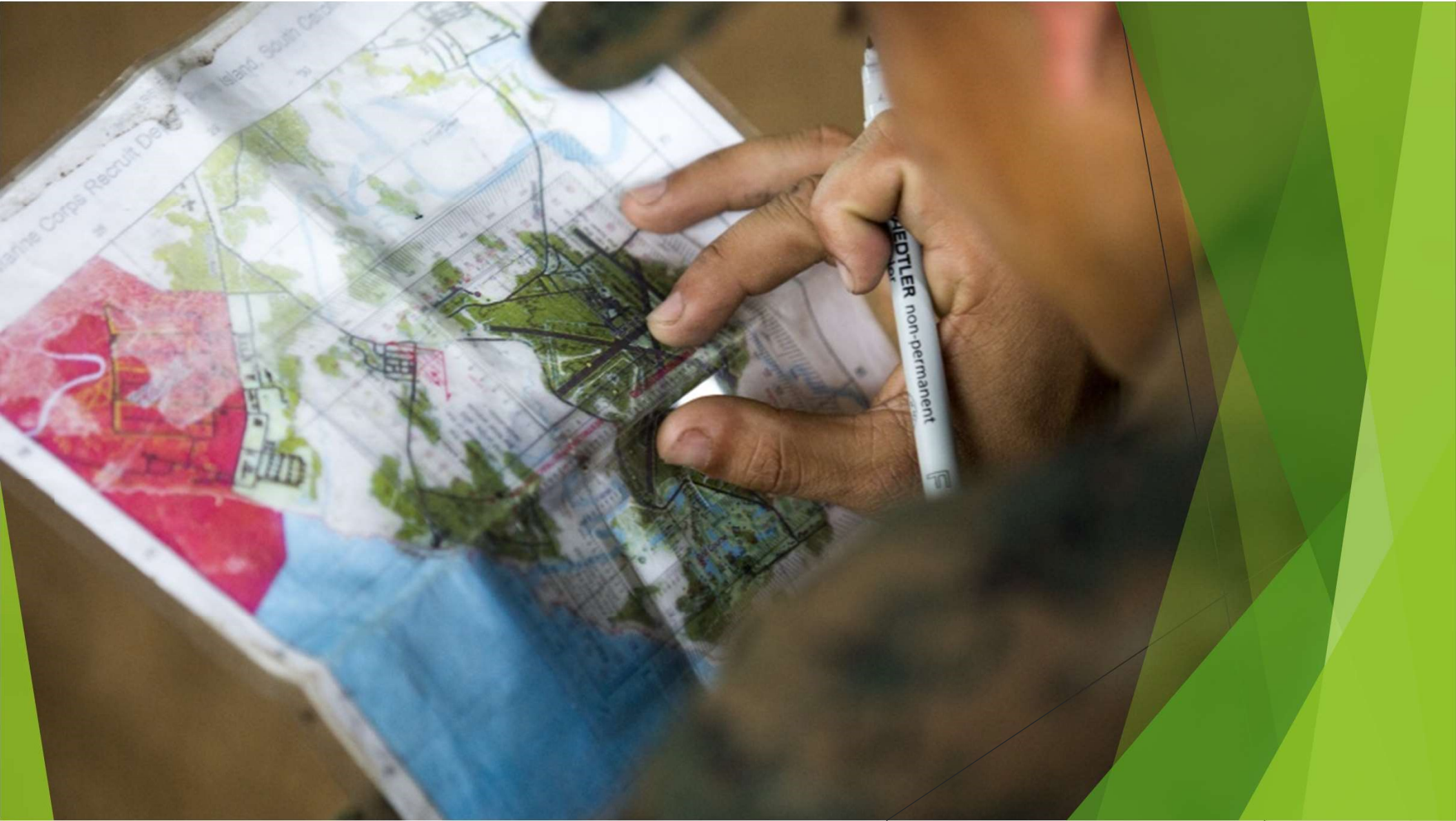
LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives



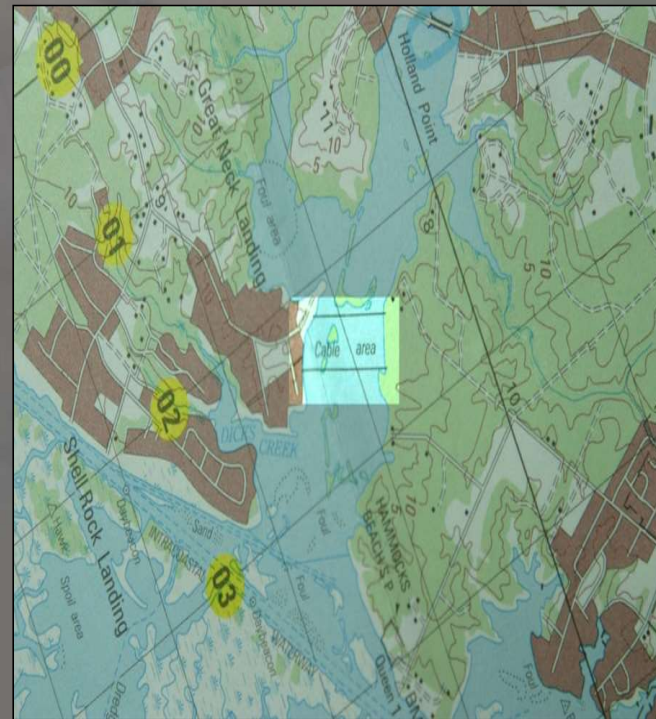
The background of the slide features a close-up photograph of a map. A hand is visible, with a finger pointing to a specific location on the map. The map shows various geographical features, including a red-shaded area and some text. The overall scene is slightly blurred, focusing attention on the text overlay.

Map Information

- Purpose: Provides information on the existence, the location, and the distance between ground features
- Definition: A geographic representation of the earth's surface drawn to scale as seen from above

Map Characteristics

- Designed to show common info
- Location of ground objects
- Populated areas
- Routes of travel
- Communications Lines
- Extent of vegetation cover
- Elevation and relief of the earth's surface



Map Care

- Maps are printed on paper and require protection from:
 - Water
 - Mud
 - Tearing
- When marking:
 - Use lighter lines which are easily erased without smearing
- If trimming the map:
 - Be careful not to cut any of the marginal information

Tactical Significance

- Maps must be protected because they can hold tactical information:
 - Friendly Positions
 - Supply Points

The background of the slide features a close-up photograph of a hand holding a white pen over a map. The map is partially visible, showing a red area with a white line and some text. The hand is positioned as if about to draw or mark the map. The overall scene is set against a dark, blurred background.

Map Illustrations

- Mapmakers use standard symbols
- They represent natural and manmade features
- Resemble as close as possible, the actual features but as viewed from above



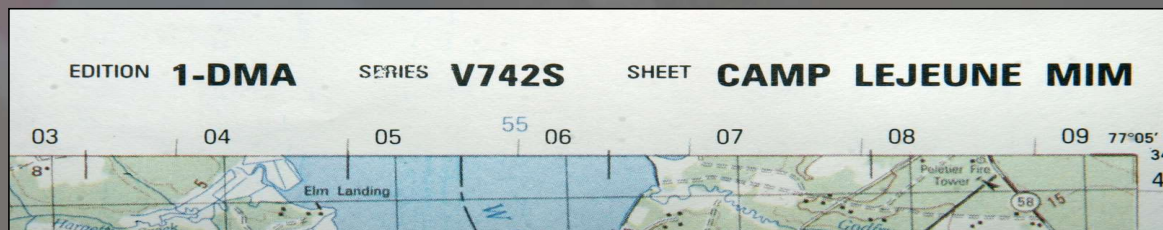
Margin Information

- All maps are not the same, so it becomes necessary every time a different map is used to examine the marginal information carefully

Margin Information

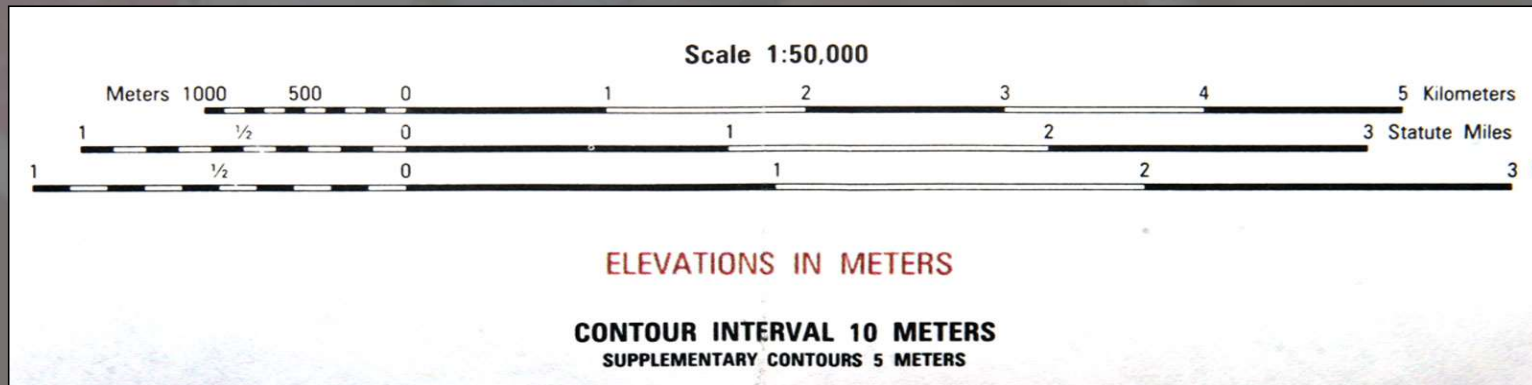
Includes:

- Margin of Information
- Sheet Name
- Series Name
- Series Number
- Scale Notation
- Edition Number
- Index to Boundaries



Margin Information

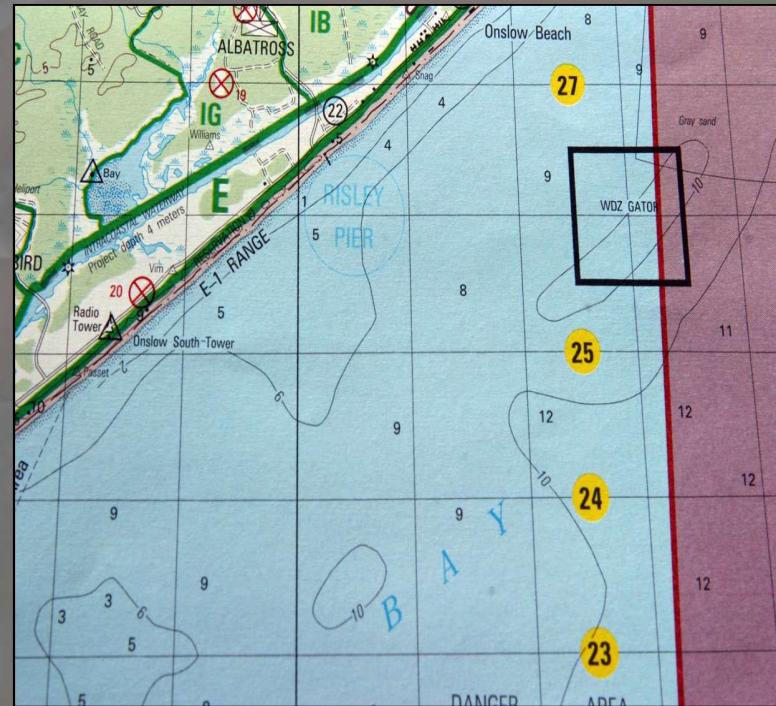
- Contour Interval:
 - Appears in the center lower margin
 - States the vertical distance between adjacent contour lines on the map



Margin Information

Grid Box:

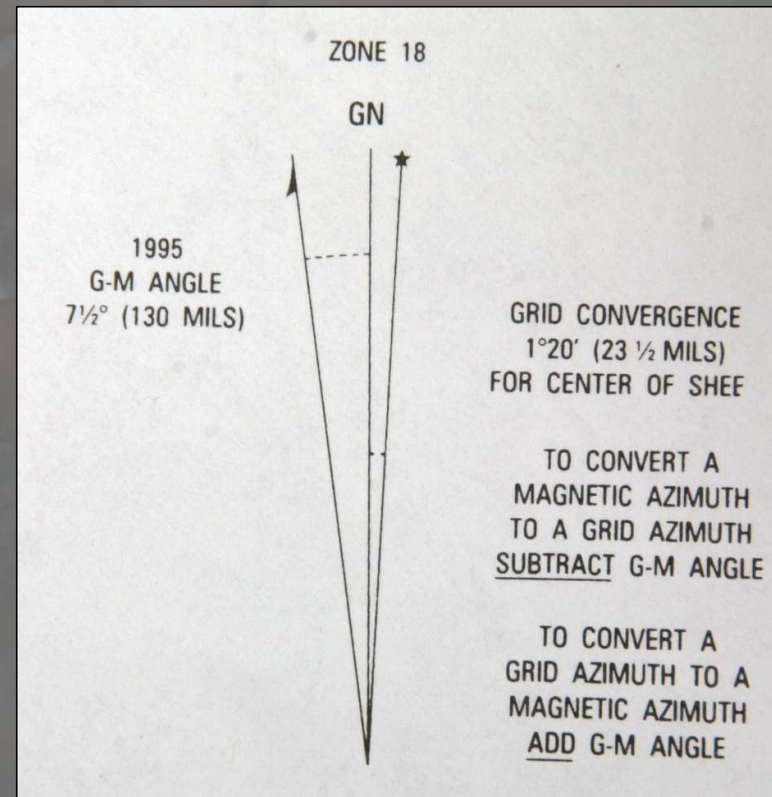
- Gives basic instruction on reading grids in determination of specific points on the map



Margin Information

Declination Diagram:

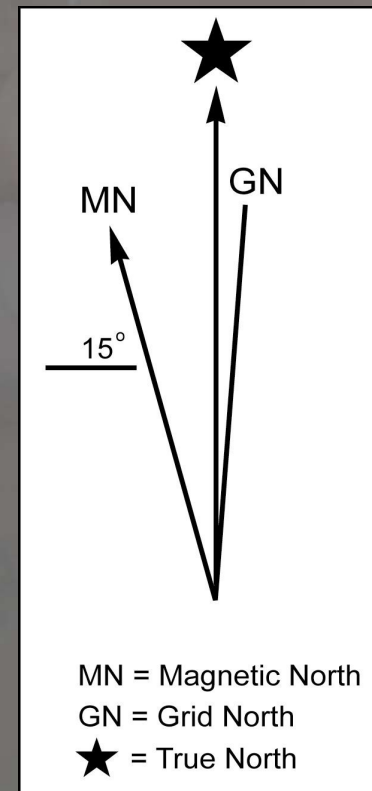
- It is located in the lower left margin of the large scale on the map and indicates the angular relationship of:
 - True North
 - Grid North
 - Magnetic North



Margin Information

▶ True North:

- A line from any position on the earth's surface connects at the North Pole
- Unlike grid lines, all lines of longitude are true north lines



Margin Information

Magnetic North:

- The direction to the North Magnetic Pole, as indicated by the north seeking needle of a magnetic compass
- The North Magnetic Pole is located in Canada at Hudson Bay.



The background of the slide features a map with a grid overlay. A hand is visible holding a pen, suggesting the map is being used for a task. The map includes text such as "Marine Corps Recruit Depot" and "South Carolina".

Margin Information

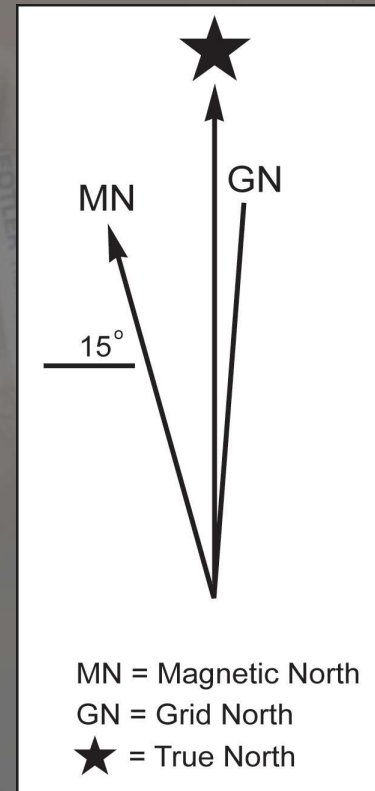
Grid North:

- The north that is established by the vertical grid lines on the map
- The variation between grid north and true north is due to the curvature of the earth

Margin Information

Grid Magnetic (GM) Angle:

- The GM angle is used to convert magnetic azimuth to grid azimuth and vice versa



Margin Information

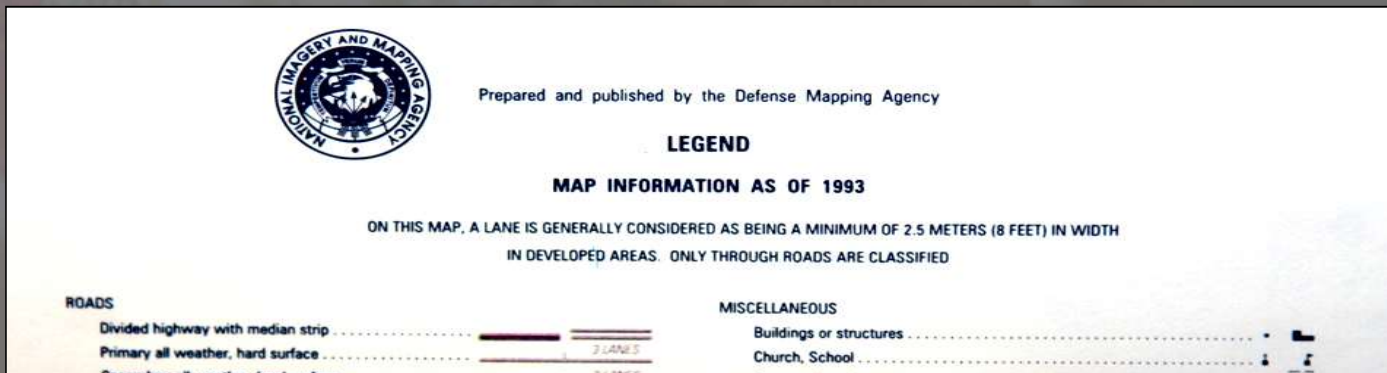
Grid Magnetic (GM) Angle:

- Determine the Grid azimuth with a protractor, measuring from Grid North
- Magnetic Azimuth is taken from a compass and measured from Magnetic North
- Note: To convert one azimuth to the other, simply read the directions in the declination diagram

Margin Information

Legend:

- Located in the lower left margin
- Illustrates and identifies some of the symbols on the map



Margin Information

Legend note:

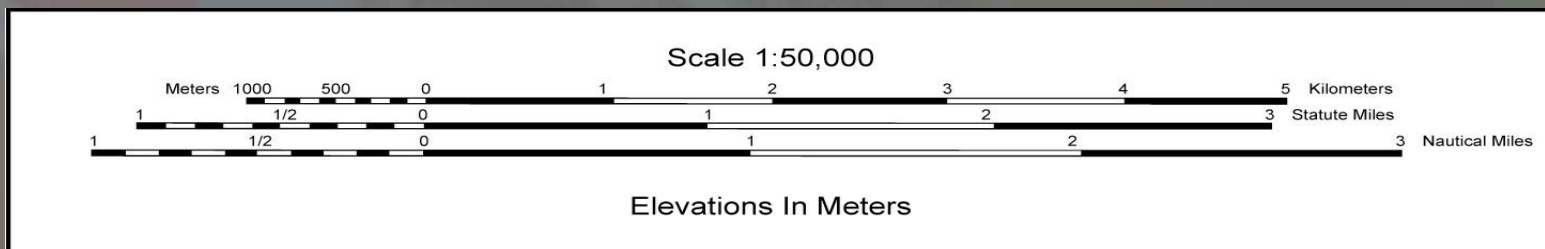
- Every time a map is used, refer to the Legend to prevent errors in symbol identification

LEGEND	
ROADS	
Divided highway with median strip	
Primary, all weather, hard surface	
Secondary, all weather, hard surface	
Light duty, hard or improved surface	
Fair or dry weather, unimproved surface	
Trail	
Route markers: Interstate, Federal, State	
Bridge	
RAILROADS (Standard gauge 144 m - 48 1/2")	
Single track	
Multiple track	
Nonoperating	
Railroad station: Location known	
Car line	
Railroad bridge	
Tunnel: Highway, Railroad	
BOUNDARIES	
National, with monument	
State, territory	
County, parish	
Civil township, town	
Incorporated city, village, town	
Reservation: National; State; Military	
Power transmission line	
Buildings	
Structures	
Church; School	
Power substation	
Windmill; Watermill	
Well; Tank	
Mine shaft	
Open pit mine or quarry	
Horizontal control station	
Bench mark, monumented	
Bench mark, non-monumented	
Spot elevations in meters	
Levees, rims, dikes	
Bluffs, cliffs	
Woodland	
Scattered trees; Scrub	
Vineyard; Orchard; plantation	
Intermittent lake; Dam; Earthen; Masonr	
Stream: Perennial; Intermittent	
Marsh, swamp	
Small falls; Large falls	
Small rapids; Large rapids	

Margin Information

Bar Scales:

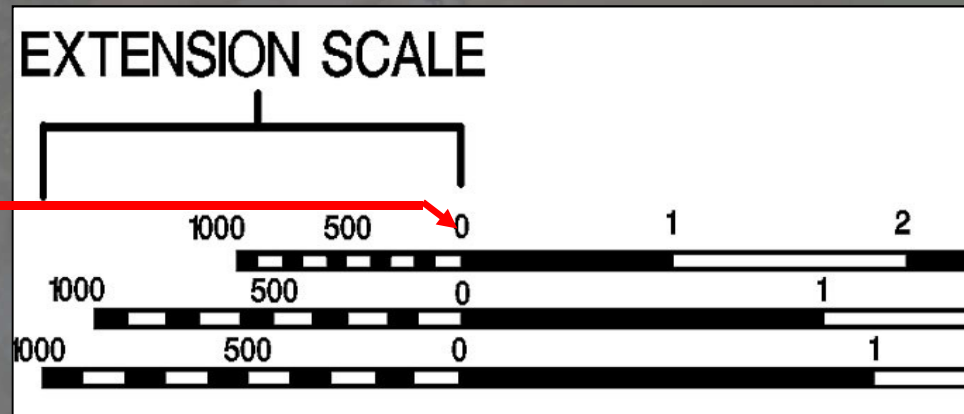
- Located at the center bottom of the margin
- Special "rulers", ground distance may be measured directly without having to convert the map scale ratio
- Normally, the scale for meters, yards, statute miles (land) and nautical miles (sea)



Margin Information

Extension scale:

Easy to use, but notice that “zero” is not at the end of the scale.





Map Colors

- To ease the identification of features on the map, the topographic symbols are usually printed in different colors, with each color identifying a class of features



Map Colors

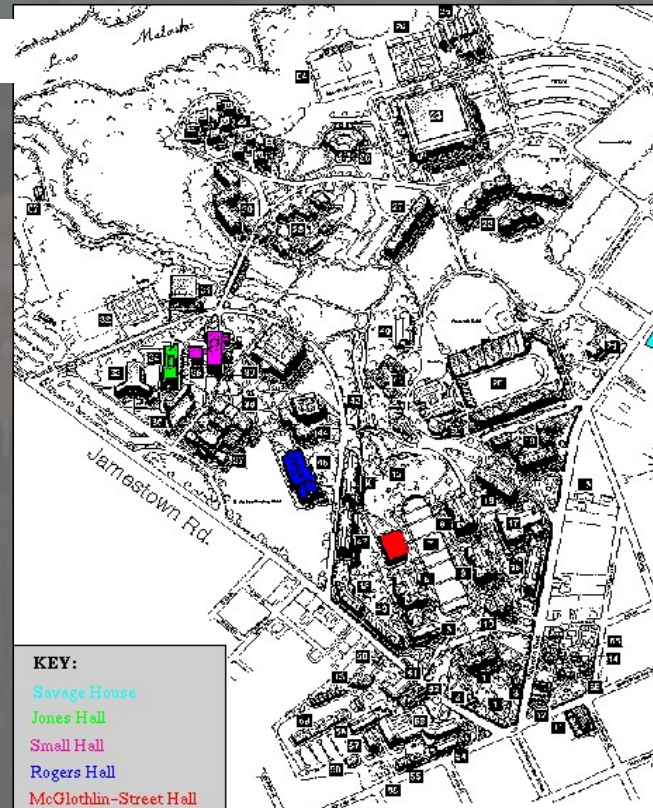
- The colors vary with different types of maps, but on a standard, large scale, topographic map, there are five basic colors:

- **Black**
- **Red**
- **Blue**
- **Green**
- **Red / Brown**

Map Colors

BLACK

- Used to identify the majority of cultural or man made features:
 - Buildings
 - Bridges
 - Roads not shown in red



Map Colors

RED

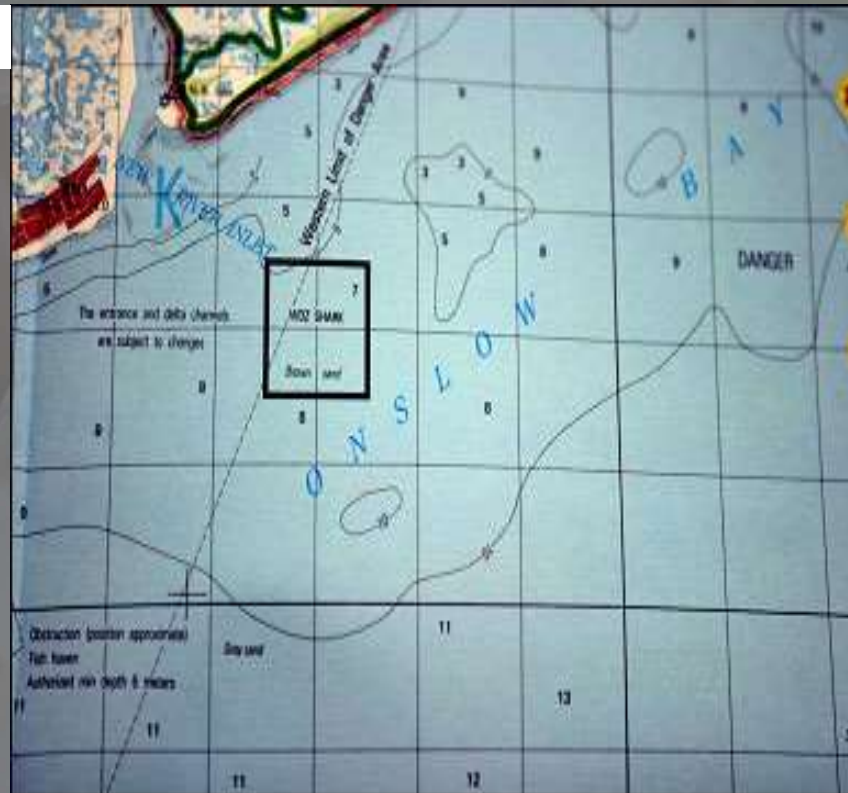
- Main roads, built up areas, and special features such as dangerous or restricted areas



Map Colors

BLUE

- Water features
 - Lakes
 - Rivers
 - Swamps
 - Streams



Map Colors

Green

- Identifies vegetation
 - Woods
 - Orchards



Map Colors

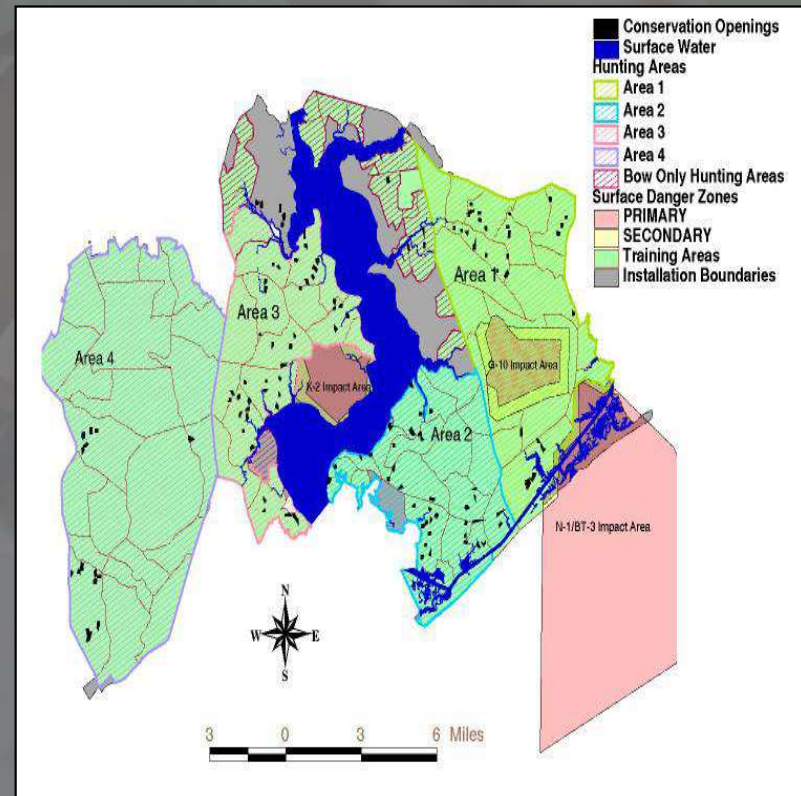
Red / Brown

- All landforms:
 - Contours
 - Fills
 - Cuts



Map Colors

Occasionally other colors may be used to show special information. These will be indicated in the margin for information.





Contour Lines

- Most common way of indicating elevation and relief on maps
- A line representing an imaginary line on the ground, along which all points are at the same elevation



Contour Lines

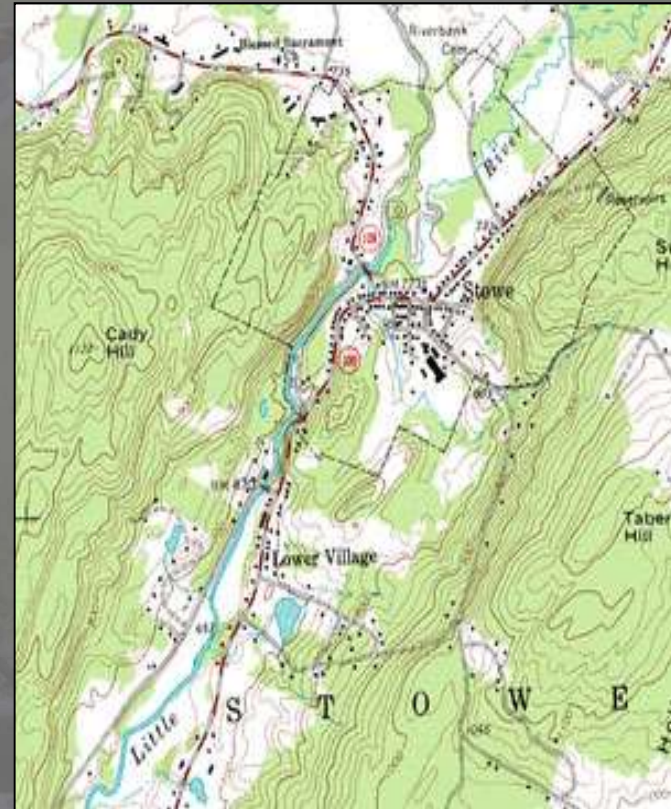
- Printed **red-brown**, starting at zero elevation
- Every fifth contour line is a heavier brown line
- These heavy lines are known as index contour lines. Also, some place along this heavy brown line, the elevation is given



Contour Lines

Spacing of Contour Lines:

- Indicate the nature of the slope
- The closer the contour lines, the steeper the slope



Land Formations

Hill:

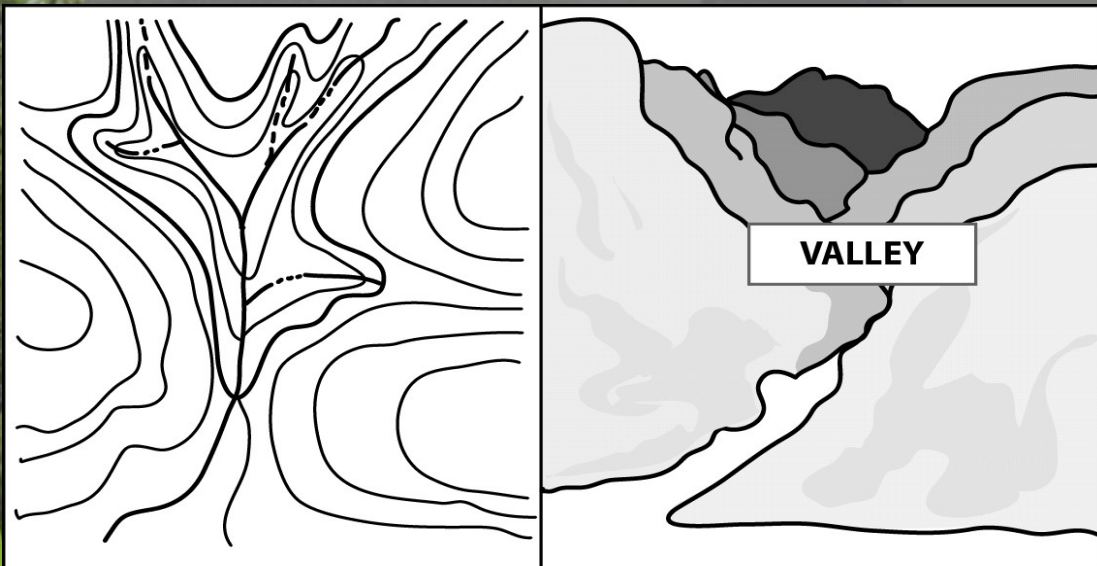
- A point or small area of high ground



Land Formations

Valley:

- A stream course bordered on the sides by higher ground
- Contours indication a valley are "U" shaped, and the curve of the contour crossing always points up



Land Formations

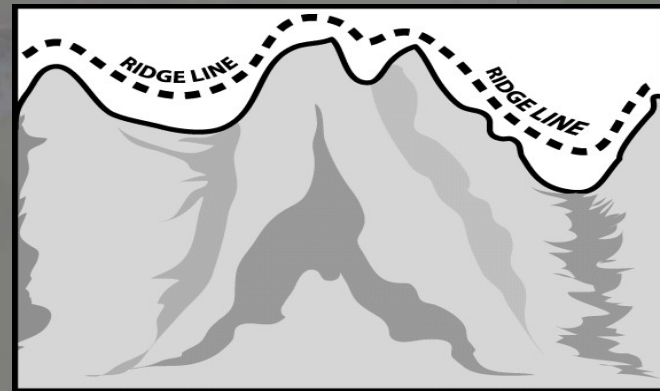
Draw:

- A less developed stream in which there is essentially no level ground, therefore, has little or no maneuver room
- The ground slopes upward on each side and towards the head of the draw, contours indicating a draw are "V" shaped, with the point of the "V" toward the head of the draw



Land Formations

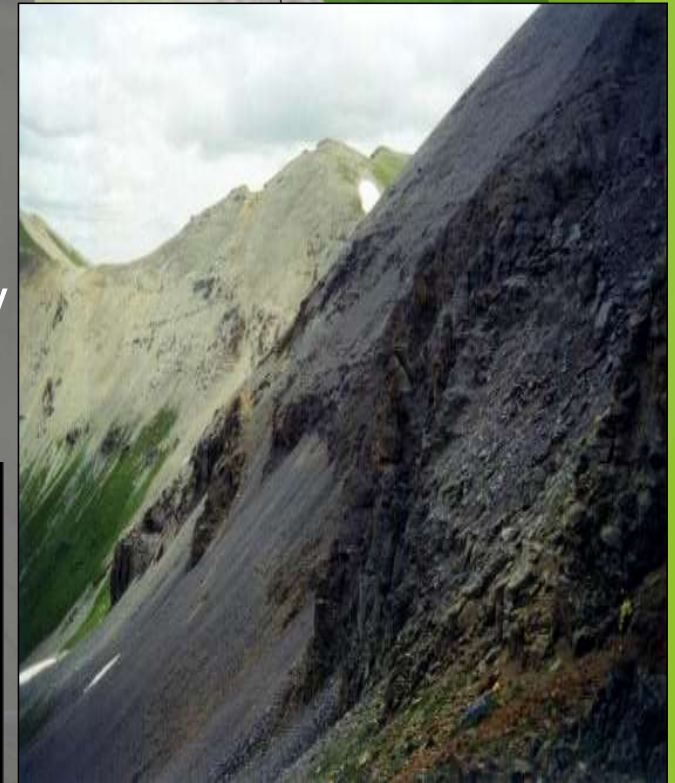
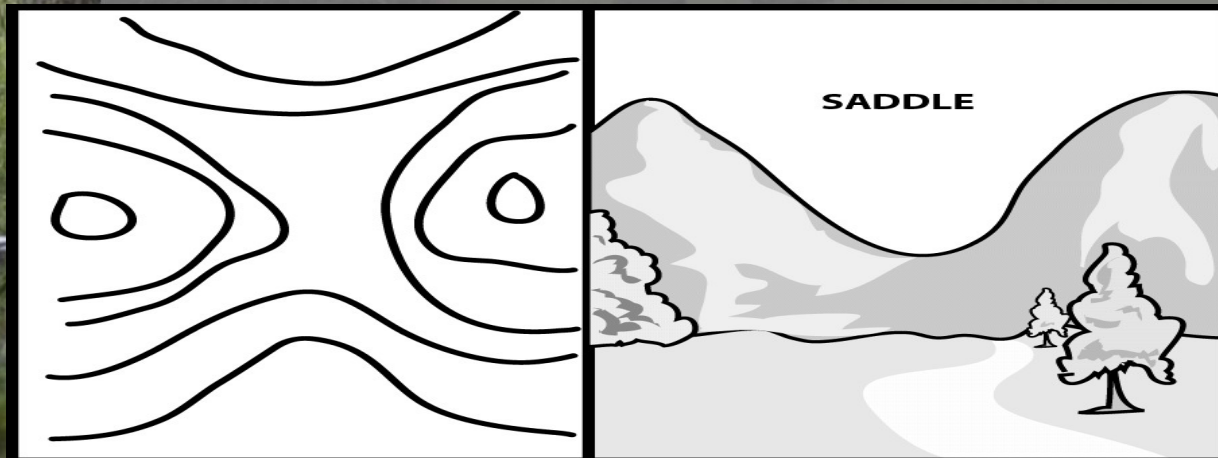
- Ridge:
 - A line of high ground, with normally minor variations along its crest
 - The ridge is not simply a line of hills, all points of the ridge crest are higher than the ground on both sides of the ridge



Land Formations

Saddle:

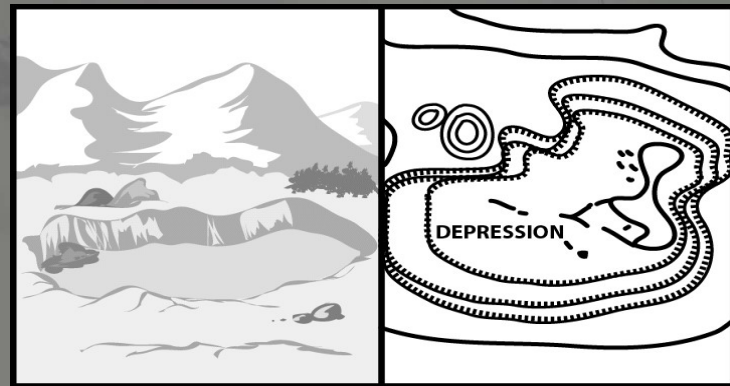
- A dip, or low point along the crest of a ridge
- A saddle is not necessarily the lower ground between two hilltops, it may simply be a dip or break along an otherwise level ridge rest



Land Formations

Depression:

- A low point or sinkhole, surrounded on all sides by higher ground



Land Formations

Cliff:

- A vertical, or near vertical, slope

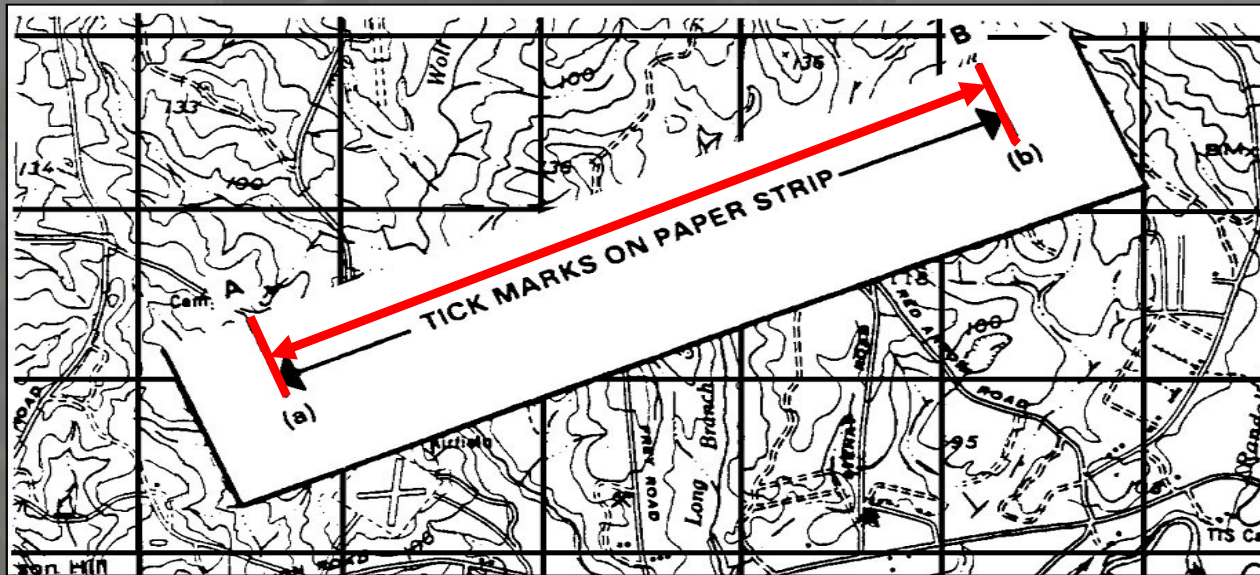




Measuring Distance

Straight Line Distance:

- Distance between 2 points

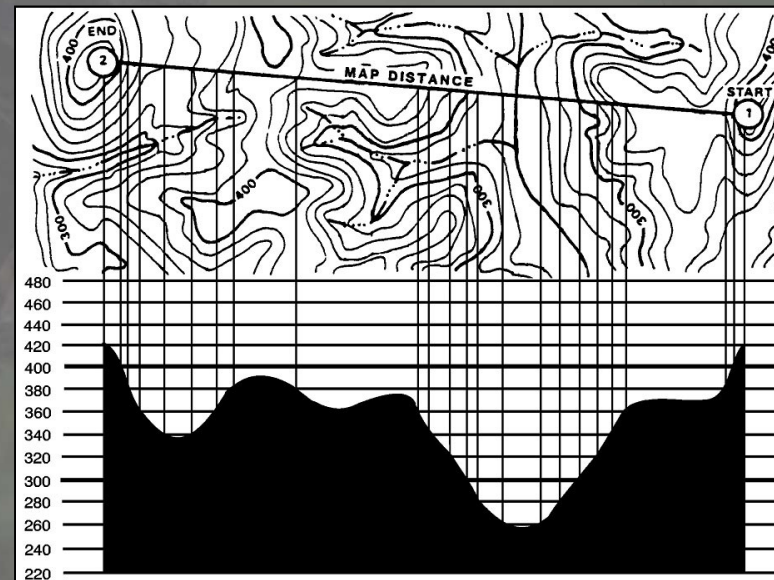


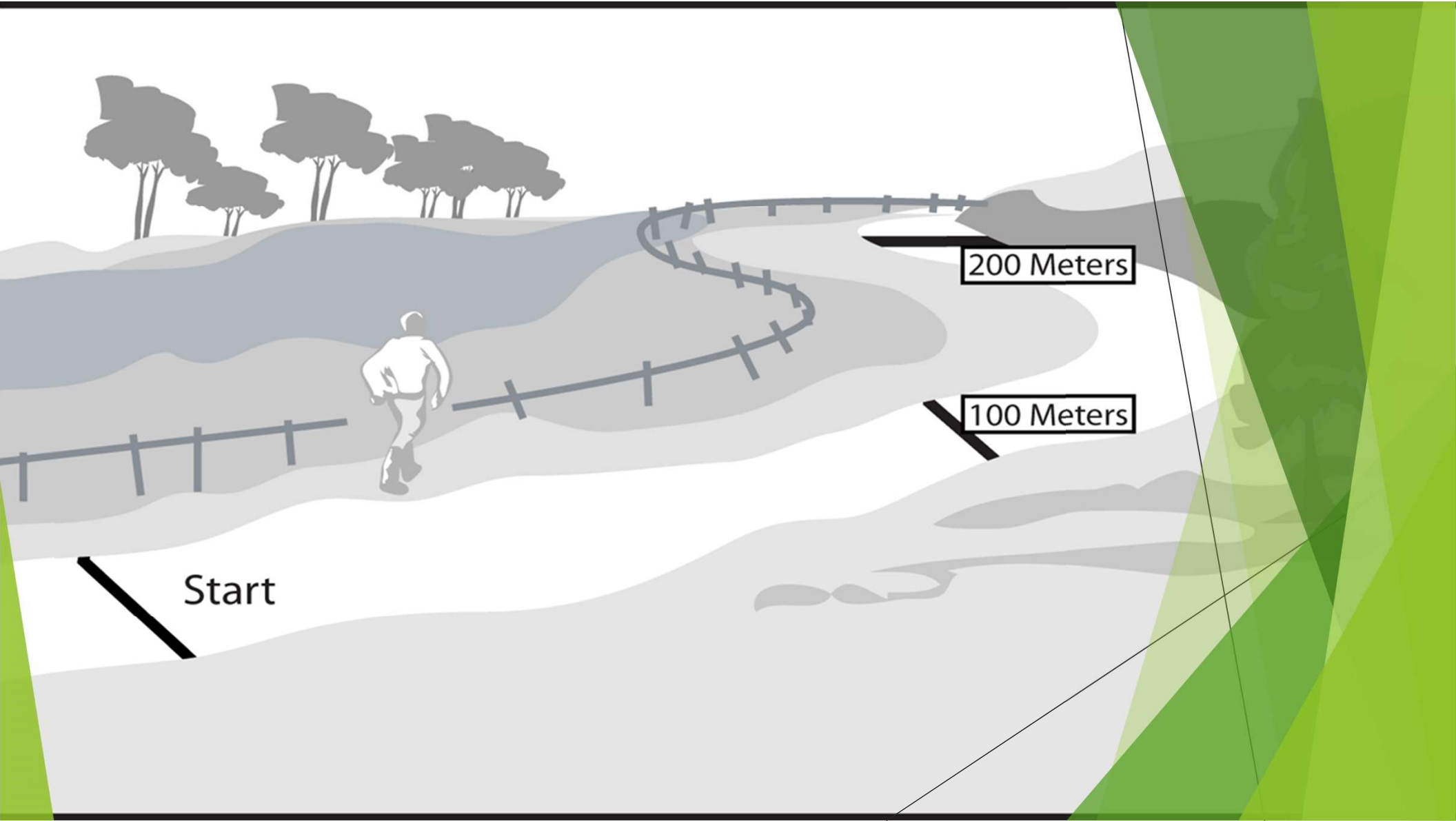
Measuring Distance

Curved or Irregular Distance:

■ Measure distance along:

- A winding road
- Stream
- Any other curved line





Start

200 Meters

100 Meters

Pace Count

- Used to keep a record of ground distance
- Record your count in 100-meter increments
- Step off with your left foot and count every time the left foot hits the deck
- Record your 100-meter increments by putting a knot in a rope or piece of string





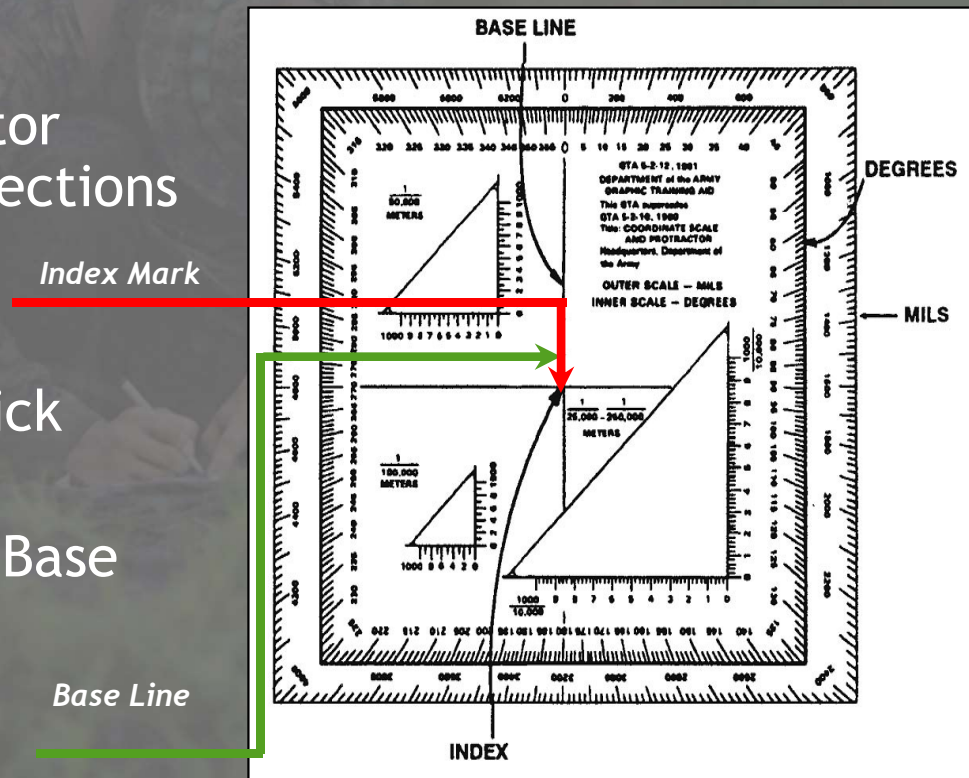


Locate Position

Protractor

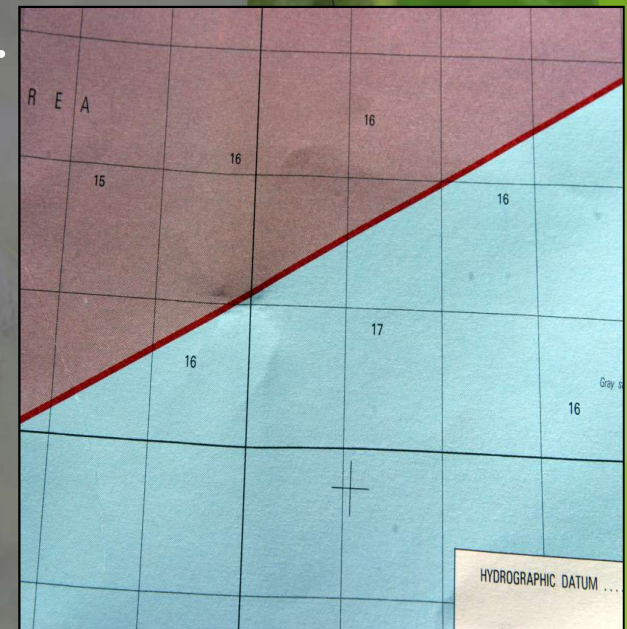
Tool used to locate the position on a map.

- Index Mark:
 - Center of protractor from which all directions are measured
- Degrees:
 - Graduated in 1° tick marks ($0^\circ - 360^\circ$)
 - $0^\circ - 180^\circ$ is called Base Line



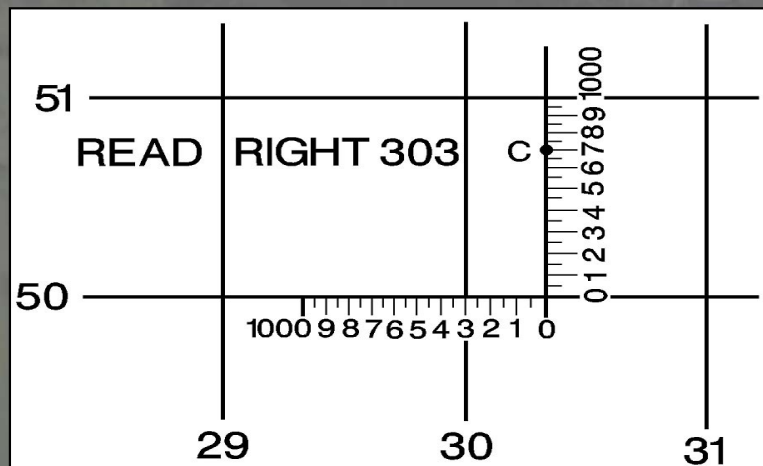
The Grid System

- The protractor is used in conjunction with the maps grid system to locate position (s).
- Tells someone where specific locations or points are
- A network of lines, in the form of squares placed on the face of the map



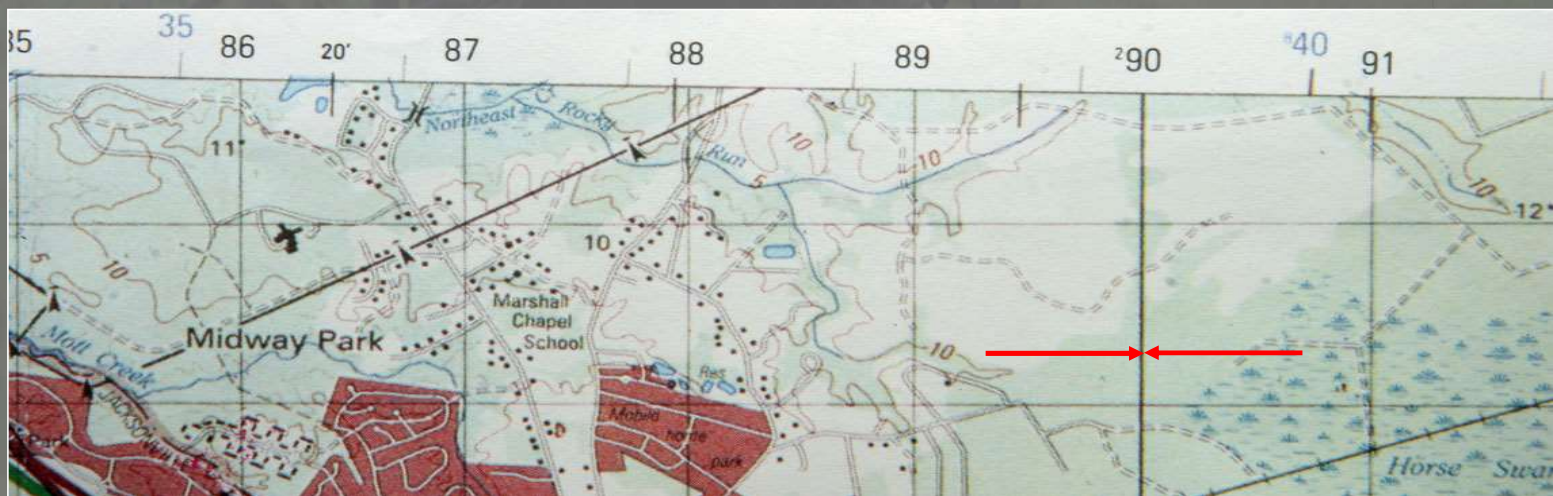
The Grid System

- Squares are somewhat like the blocks formed by the street system of a city
- The "streets" in a grid all have very simple names
- The names are all numbers



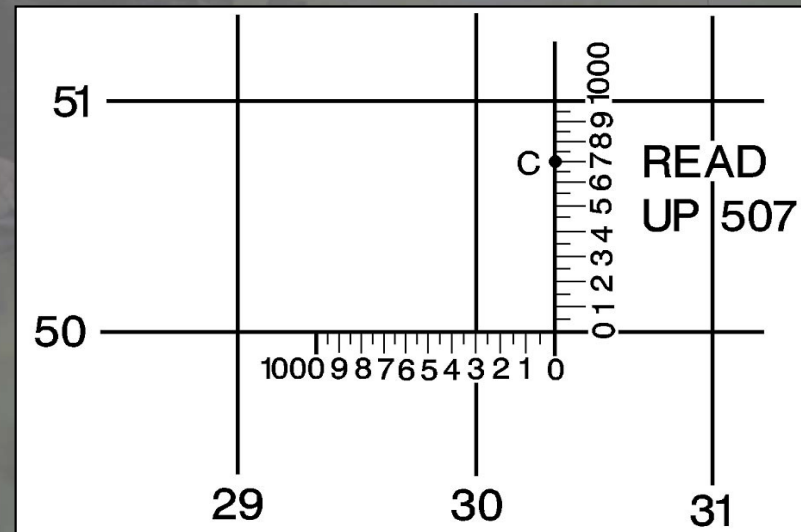
The Grid System

- Every tenth line is made heavier in weight
- This will help you find the line you are looking for
- Each grid line on the map has its own number



The Grid System

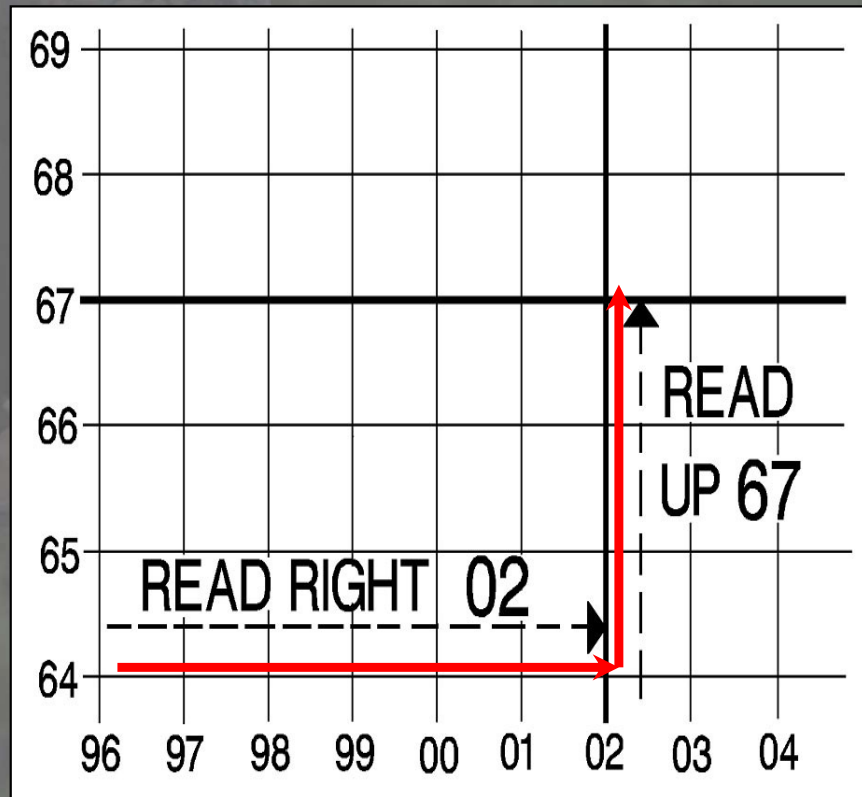
- Four digit numbers identify a 1,000 square meter grid square
- Six digits identify:
 - 100-meter grid square
- Eight digits identify:
 - 10-meter grid square



The Grid System

Map Reading Rule:

- Read Right and Up





SKILLS CHECK



Lensatic Compass

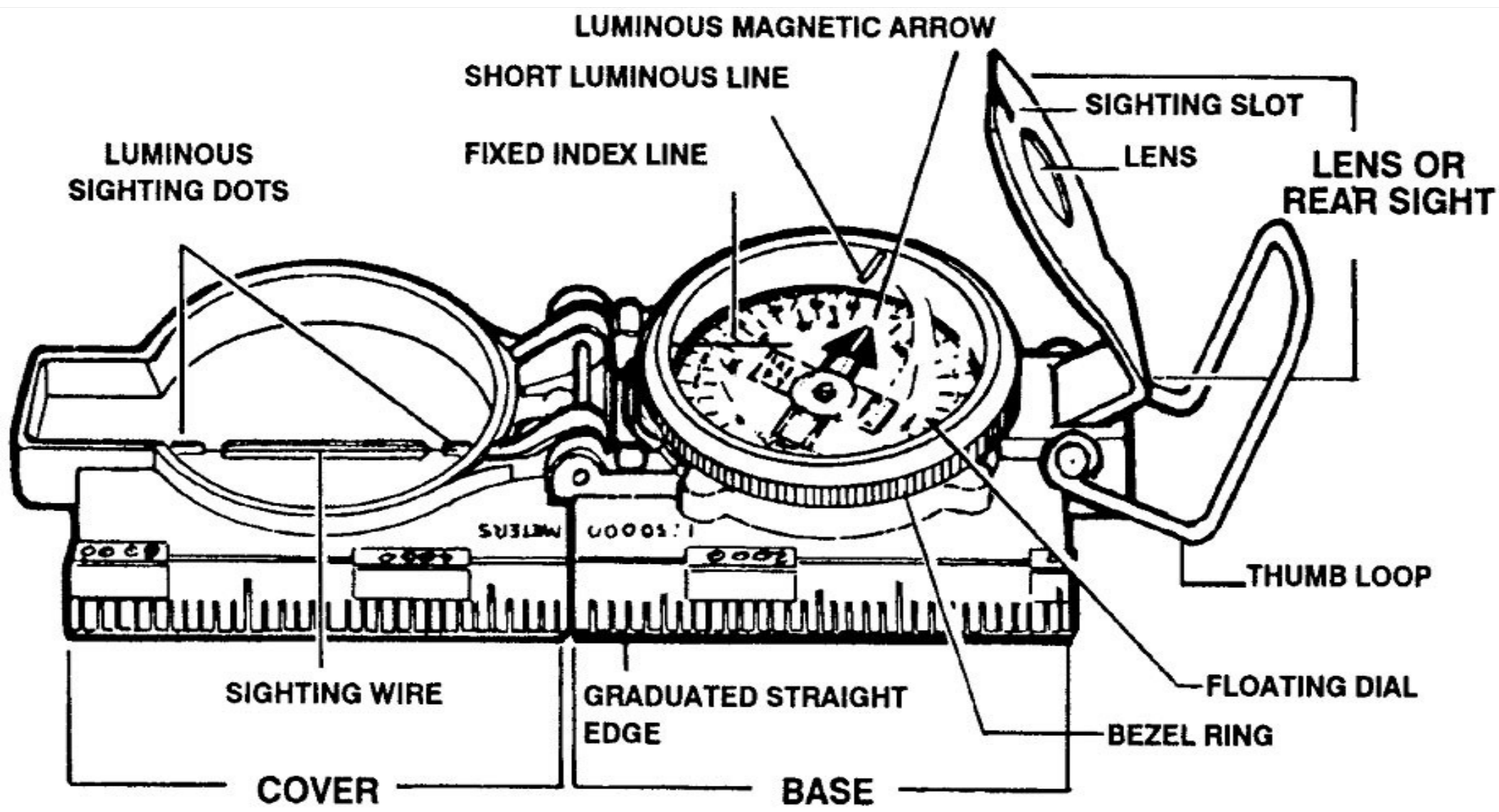
- The primary instrument used to determine and maintain direction during land navigation



Lensatic Compass Parts

- Thumb loop
- Short Luminous line
- Luminous sighting dots
- Luminous arrow, “Magnetic North”
- Lanyard
- Sighting wire
- Graduated straight edge





Lensatic Compass Precautions

- Handle with care
- Reading should never be taken near visible masses of metal or electrical circuits



Lensatic Compass Precautions

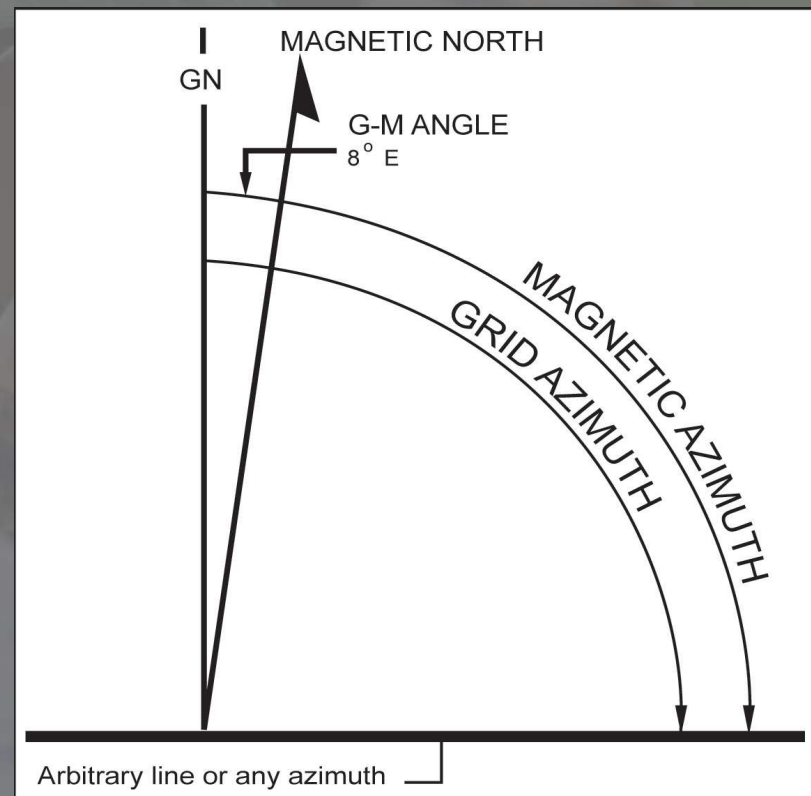
- In cold weather, always carry the compass in its pouch, outside of your outer layer of clothing



Compass Terms and Concepts

Azimuth:

An angle measured in a clockwise direction from a north base line



Compass Terms and Concepts

Grid Azimuth:

- The heading due east is an azimuth of 90°
 - South = 180°
 - West = 270°
 - North = 360° or 0°
- When using an azimuth, the point from which the azimuth originates is imagined to be the center of the azimuth circle

Compass Terms and Concepts

Obtaining A Grid Azimuth:

- Draw a line to two points
- Place the index of the protractor on point A
- Ensure the base line is parallel to the north south grid lines

Compass Terms and Concepts

Obtaining A Grid Azimuth:

- Read the inside scale
 - (Degree scale)
- This is the grid azimuth from point A to point B

Compass Terms and Concepts

Back Azimuth:

- The reverse direction of a forward azimuth
- Is comparable to doing an about face
- May be obtained by
 - Grid (protractor)
 - Magnetic (compass)

Compass Terms and Concepts

Back Azimuth:

- To obtain a back azimuth from an azimuth less than 180° :
 - Add 180
- If the azimuth is 180° or more:
 - Subtract 180

Compass Terms and Concepts

LAMS acronym for back azimuth

L- Less

A- Add

M- More

S- Subtract

If less then add, if more
then subtract

Compass Holding Methods

- The lensatic compass is used to determine or follow magnetic azimuth both day and night
- There are two recommended positions for holding the compass when navigating:
 - Compass-to-Cheek
 - Center Hold Position

A photograph of several soldiers in camouflage uniforms and bucket hats. They are holding a circular compass against their cheeks, demonstrating the 'Compass to Cheek Method'. The background is a blurred outdoor setting. A green geometric graphic is on the right side of the image.

Compass to Cheek Method

- Recommended when determining the azimuth to a distant object

Center-Hold Position

- Recommended for a predetermined azimuth (DAY and NIGHT)



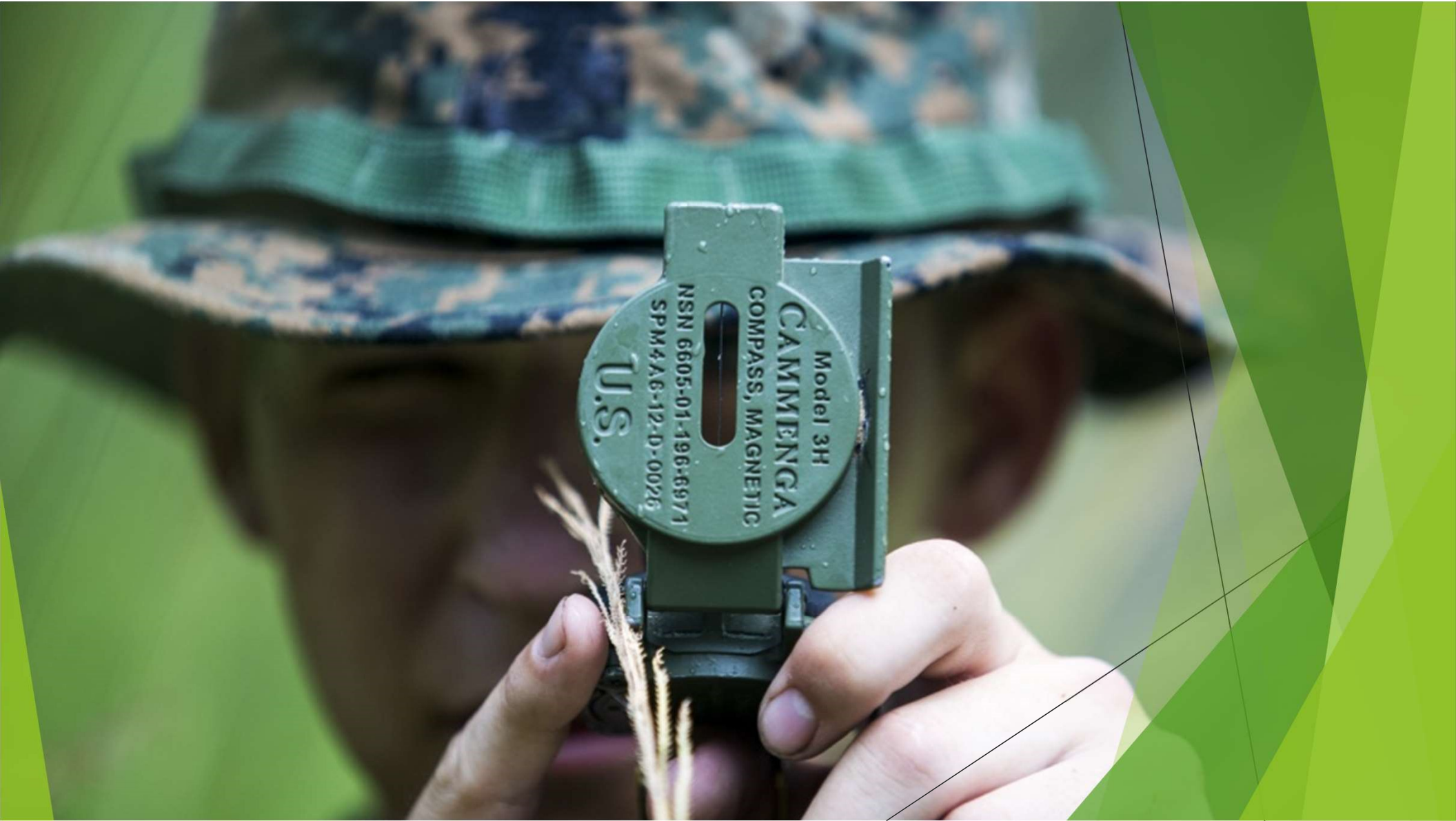
Compass Use at Night

- All the luminous features on the compass will be used
- One click on the bezel ring equals;
 - Three (3) Degrees



A photograph of several soldiers in camouflage uniforms and hats. They are gathered around a map, with one soldier in the foreground holding it open. The scene is outdoors, and the soldiers appear to be in a field or training area. A semi-transparent grey box with the text 'SKILLS CHECK' is overlaid on the image. The right side of the image features a decorative green geometric pattern.

SKILLS CHECK



ORIENTATION OF A MAP



Orientation of a Map

- A map is oriented when it is in position with its north and south corresponding to north and south on the ground

Using A Compass:

- Keep compass horizontal
- Place Compass straight edge parallel to a North-South grid with the cover of the compass pointing to the top of the map

Orientation of a Map

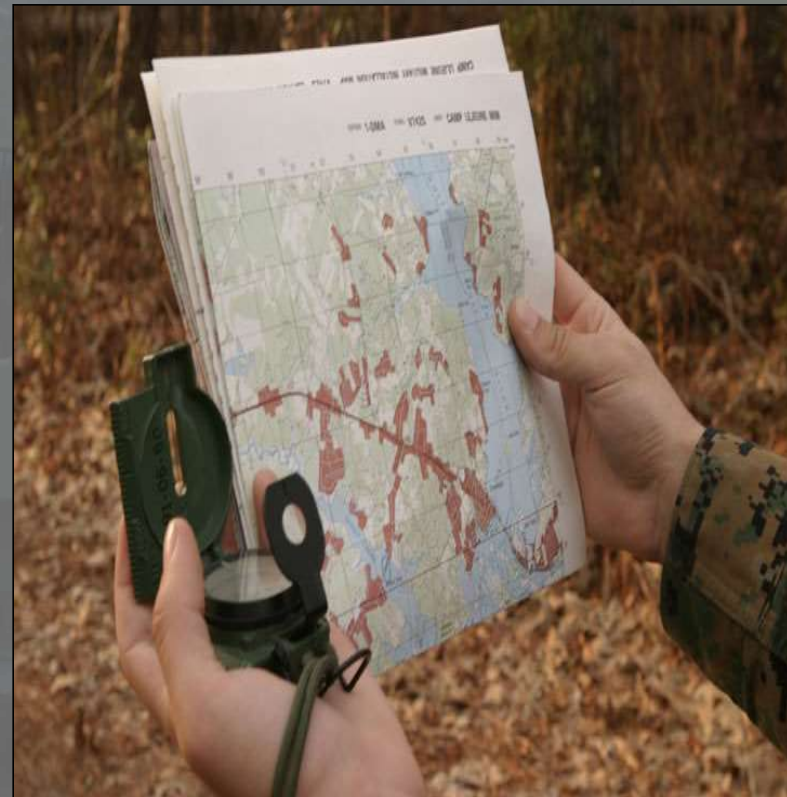
Without A Compass: Terrain Association

- Find linear features common to the ground and the map
 - Roads
 - Railways
 - Fence lines
 - Power lines etc.

Determining Location with Map and Compass

Inspection and Estimation:

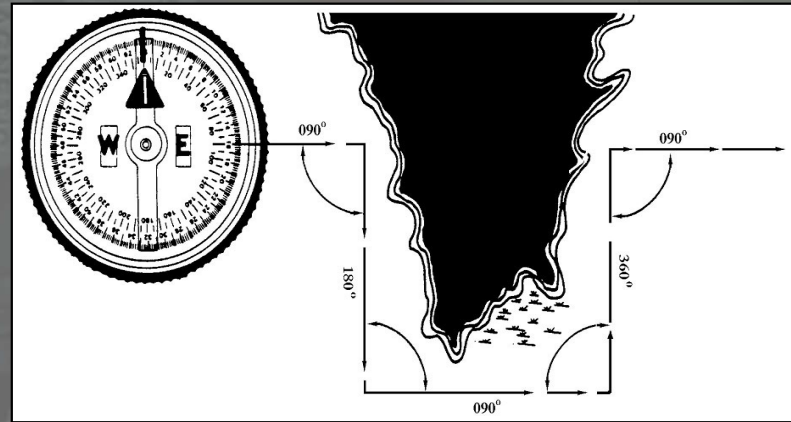
- Easiest and most simple
- Survey roads and topographical features
- Orient map to the ground
- Identify prominent landmarks



Determining Location with Map and Compass

90° Offset Method:

- To bypass enemy positions or obstacles and stay oriented
- Detour around obstacle by moving in right angles, use this formula:
 - Right, add 90°
 - Left, subtract 90° (RALS)



DEMONSTRATION

Model 3H
CAMMENGA
COMPASS, MAGNETIC
U.S.
N 6605-01-196-6971
PM4A6-12-D-0026



PRACTICAL APPLICATION

Model 3H
CAMMENGA
COMPASS, MAGNETIC
U.S.
N 6605-01-196-6971
PM4A6-12-D-0026



