

1.3 Basic Skills of Map Reading

➤ A map is

✓ a **two-dimensional** **scaled representation** **part or whole of the Earth surface** on a **flat body** such as piece of paper, black board, wood or cloth.

✓ A map is a **simplified, diminished, plain representation** of all or part of the earth's surface as **viewed vertically from above**.

✓ Map reading encompasses

✓ a systematic identification of

✓ **natural** and

✓ **manmade** features.

Basic skills...

- ✓ Although many disciplines use maps, they have a special significance for Geographers as primary tools for;
 - ✓ **displaying** and
 - ✓ **analyzing spatial distributions,**
 - ✓ **patterns and relations.**
- ✓ Since these features cannot easily be observed and interpreted in real landscapes, maps are essential to Geographers.

Importance of maps

- ✓ Maps are used for;
 - ✓ Identifying the **location** of places
 - ✓ Identifying the **direction** of places
 - ✓ Measuring the **distance** between two places
 - ✓ Measuring the **area** of places and

location

- Four conventional methods are used by map makers to give the location of places.

A. **Position by the use of place names**

- This is the most commonly used and the simplest way of giving the position of a place.
- The place is marked with a dot on the map in its accurate position.
- Once this is done a place name is attached to that dot and if any one wants to find the location of such a place, he has to look all over the map until he found the place.

Political Map of Africa



B. Position by the use of bearing and distance

- This method uses both direction and distance from a well known major place.
- Here the position of a certain place is given in a text with reference to bearing and distances from well known major places.

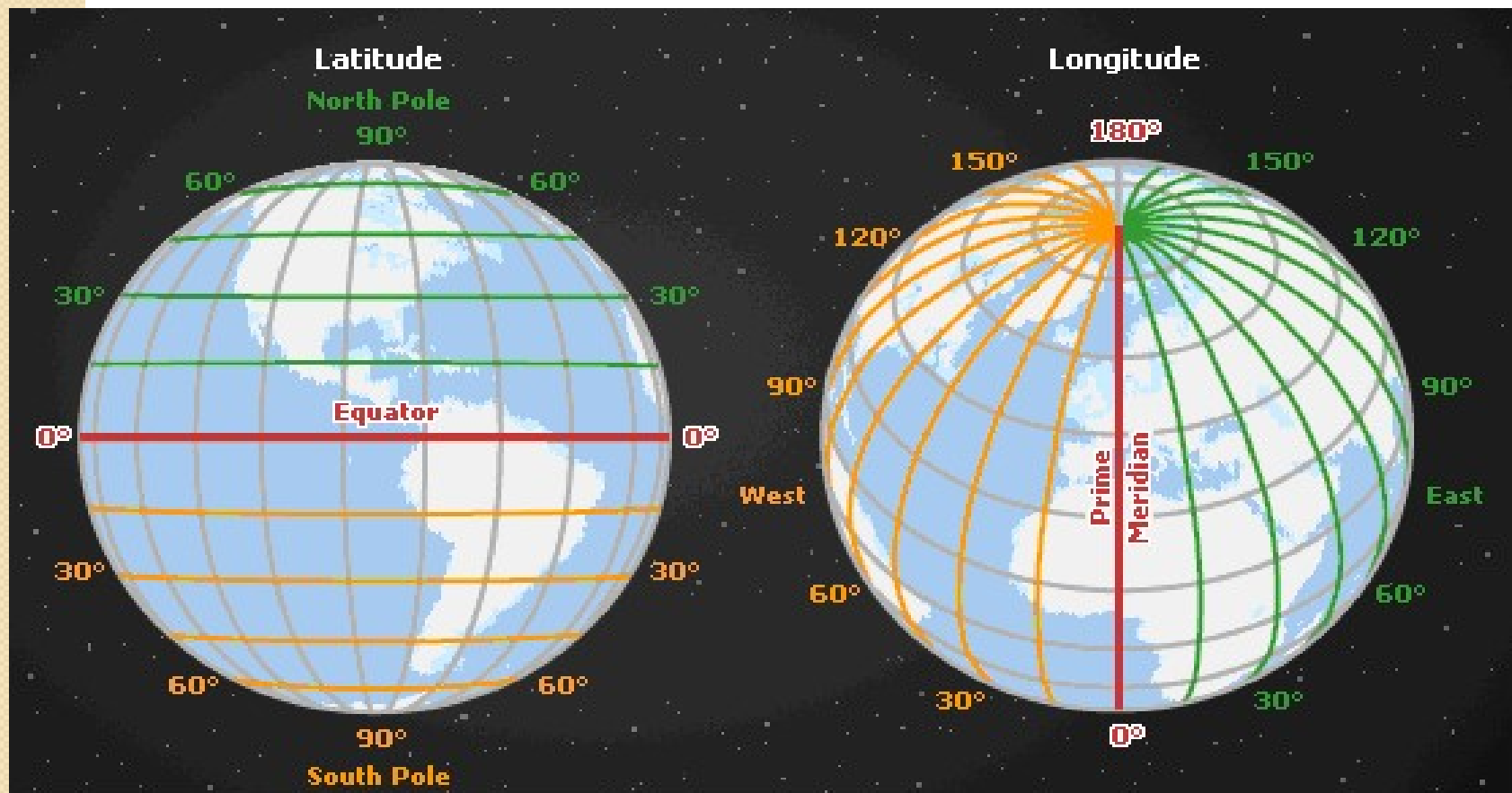
Example 2:

- Find the location of Addis Ababa in relation to Khartoum.
- Answer: Addis Ababa is located at a straight line distance of about 1000km. southeast of Khartoum.

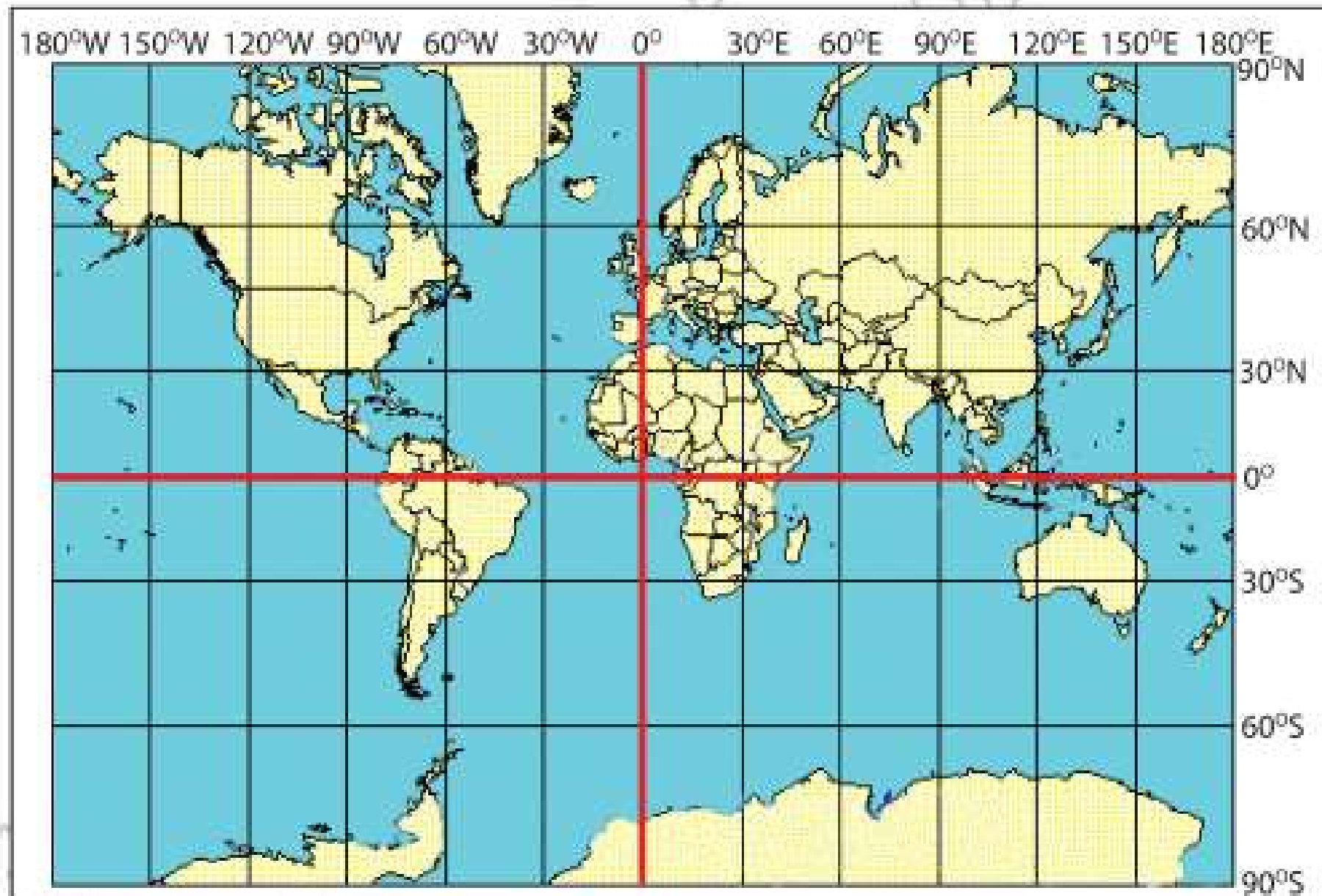
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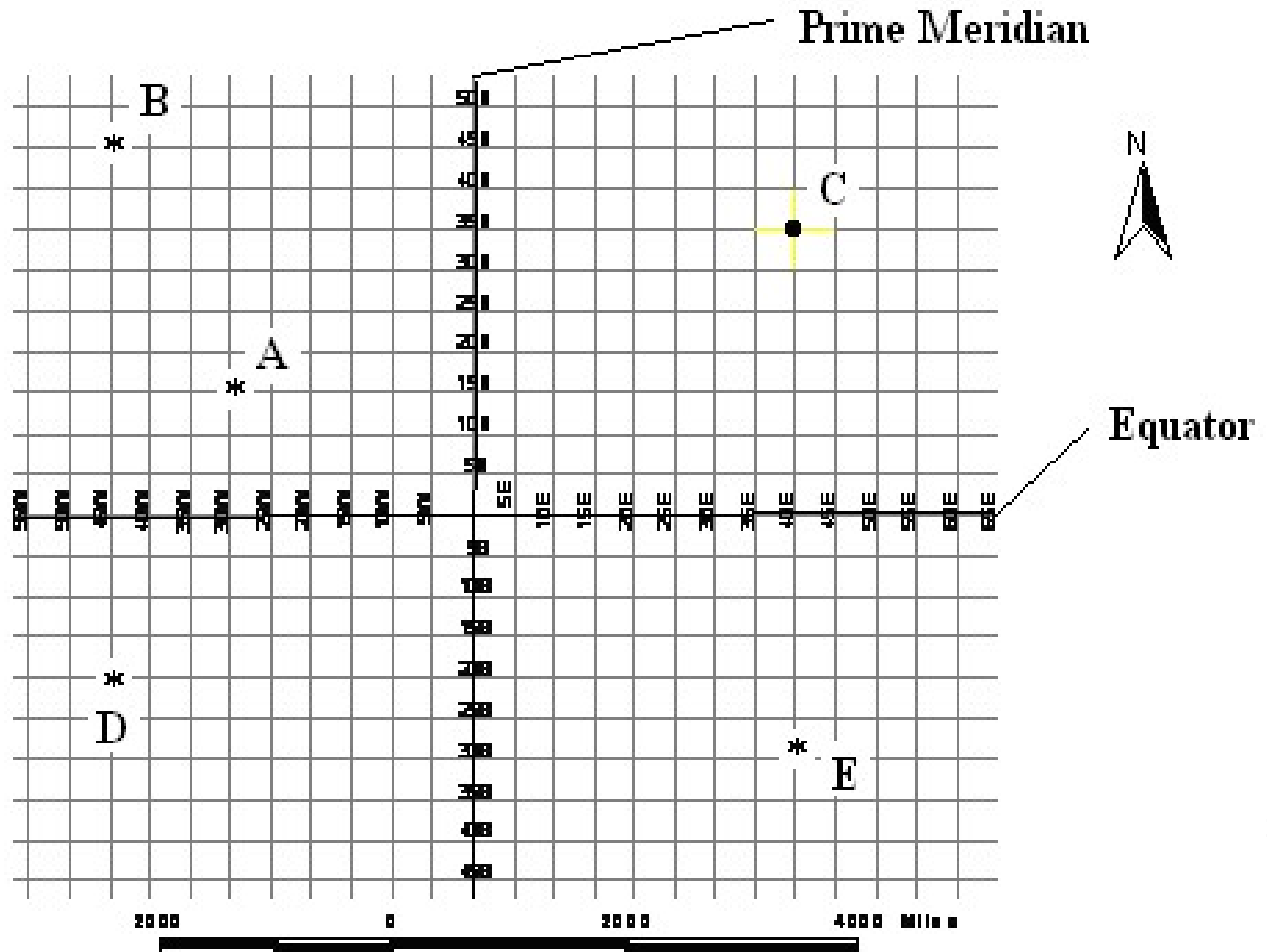
C. Position by geographical grid

- This is a method by which the position of a place can be given accurately with the help of a grid composed of a network of lines known as latitudes and longitudes.



The Geographic Grid System





Cont.

- **Example:** Find the location of “D” using latitude and longitude lines given on the above map.
-
- **Answer:** the position of “D” is 20° south latitude and 45° west longitude.
- Don't forget first you have to write latitude and then longitude

National Grid References

- **National Grid references** are used to accurately pinpoint your location on a map.
- A series of faint blue lines on every map makes up a numbered grid that is used to create the National Grid reference.
- This is a simple way of finding points and places on a map.

Types of grid reference

- There are two main types of grid reference:

1. **four-figure grid reference,**

such as '19 45', indicates a 1 km by 1 km square on the map; and

2. **six-figure grid reference,**

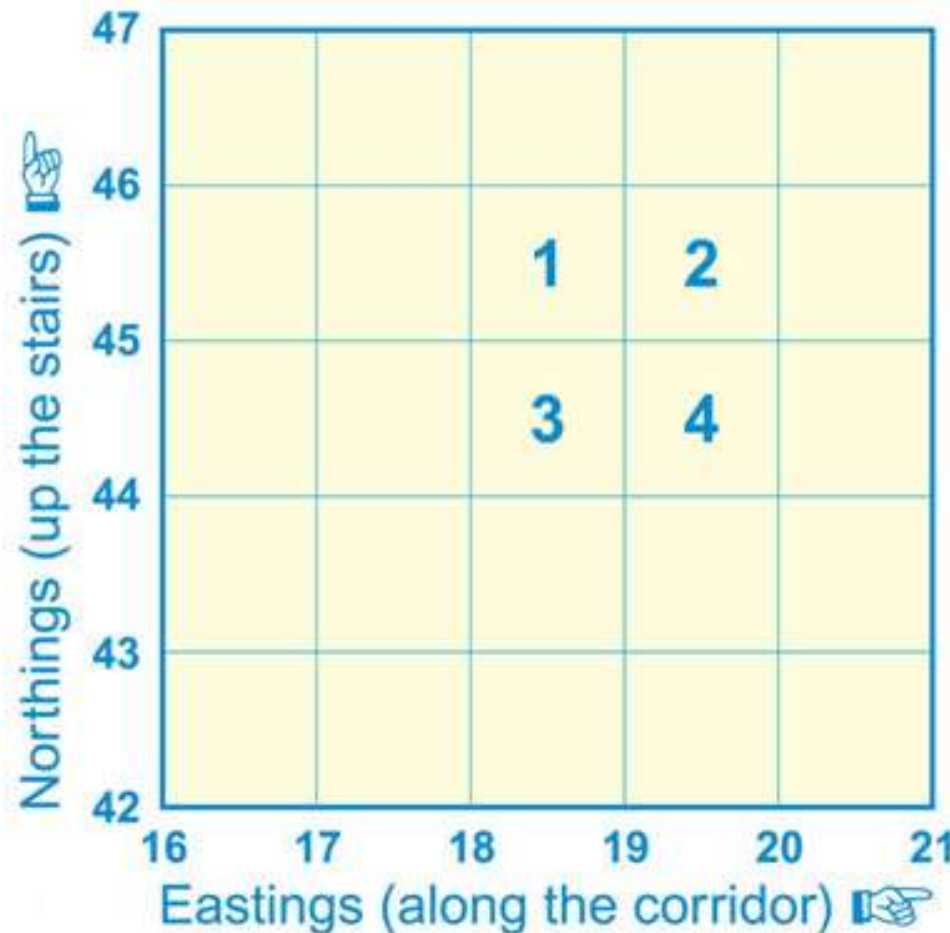
such as '192 454', indicates a 100 m by 100 m square on the map.

Four-figure grid references



Cont.

- Example, the number 2 in the diagram below is square 19 across and square 45 up and therefore, the four-figure grid reference is '1945'



The numbered squares on the diagram have the following four-figure grid references:

$$1 = 18 \ 45$$

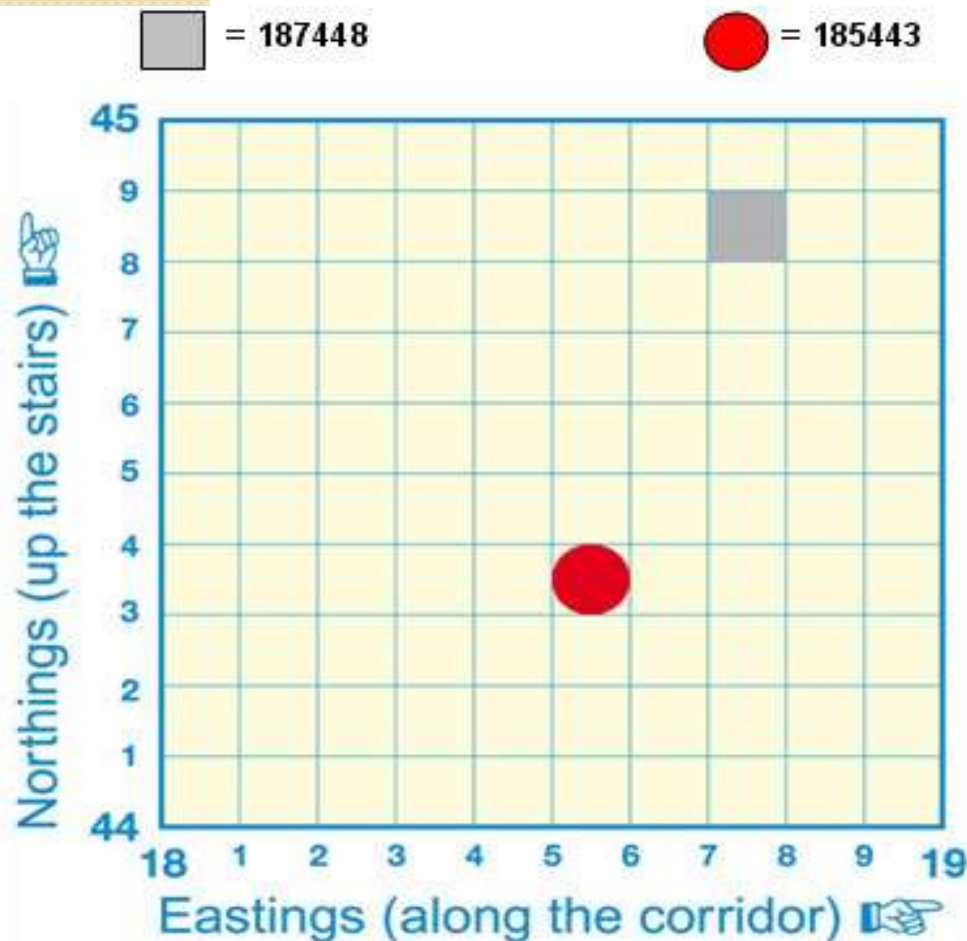
$$2 = 19 \ 45$$

$$3 = 18 \ 44$$

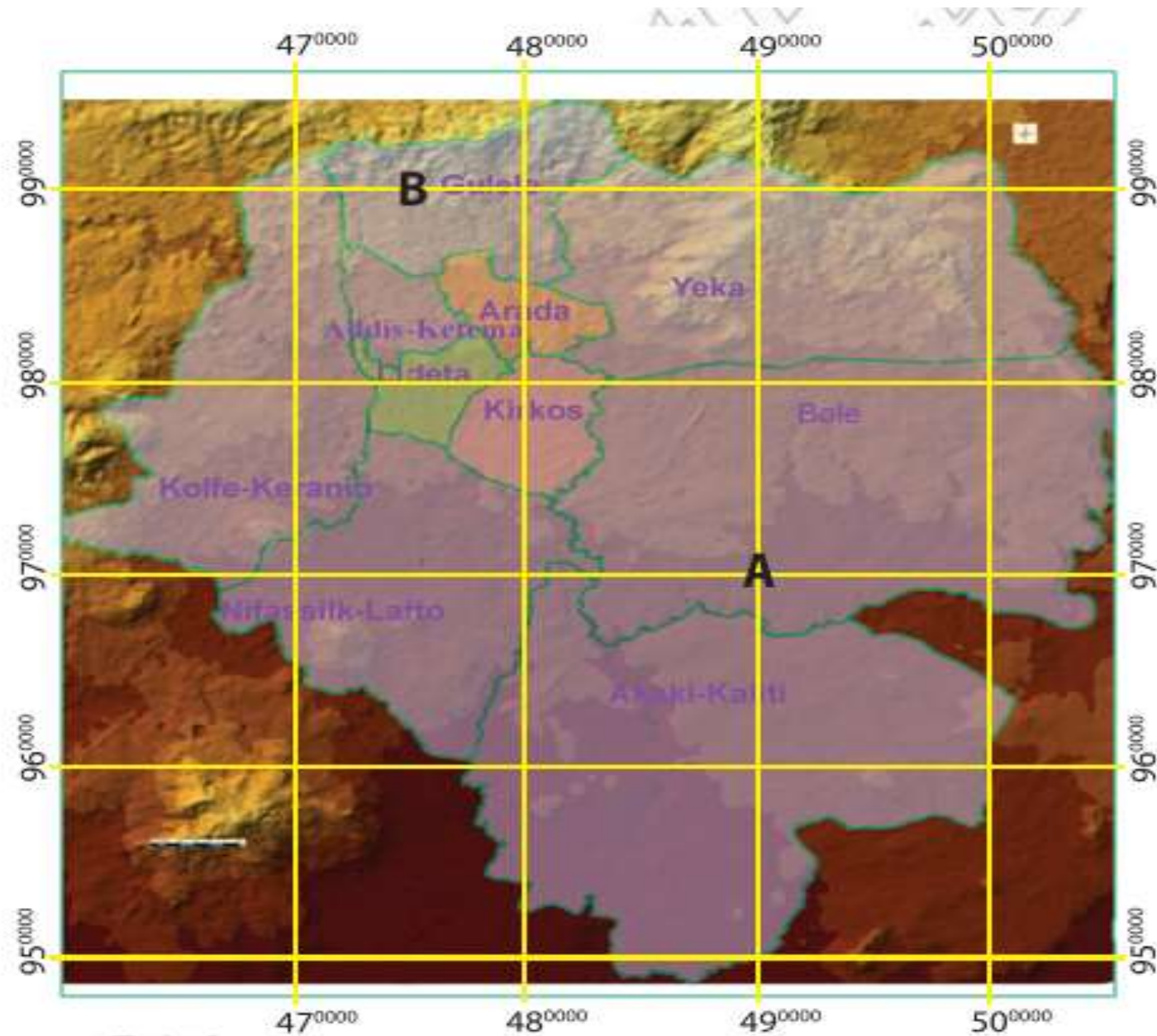
$$4 = 19 \ 44$$

six-figure grid reference

- To get the six-figure grid reference, you have to imagine that the four-figure square is further divided up into tenths.



Cont.

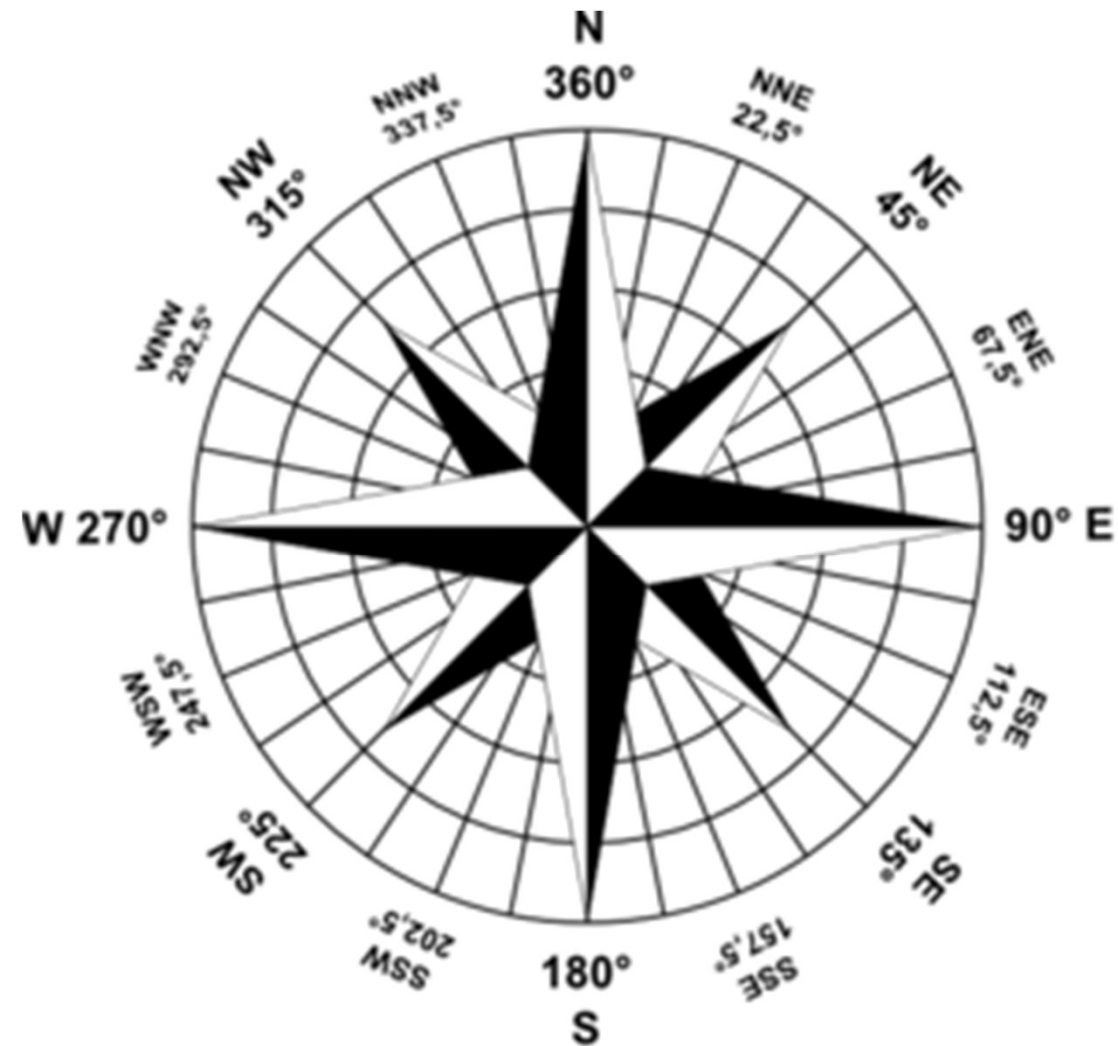


Direction

- The direction of one place from another can be found from a map.
- North direction is shown on a map as a reference to show all other directions.
- Direction from one point to another can be given in two ways; namely,
 - by **using compass points** and
 - by **using compass bearing**
- Compass cardinal points and compass bearings correspond to one another. The following diagram shows you how major cardinal points and bearings correspond.

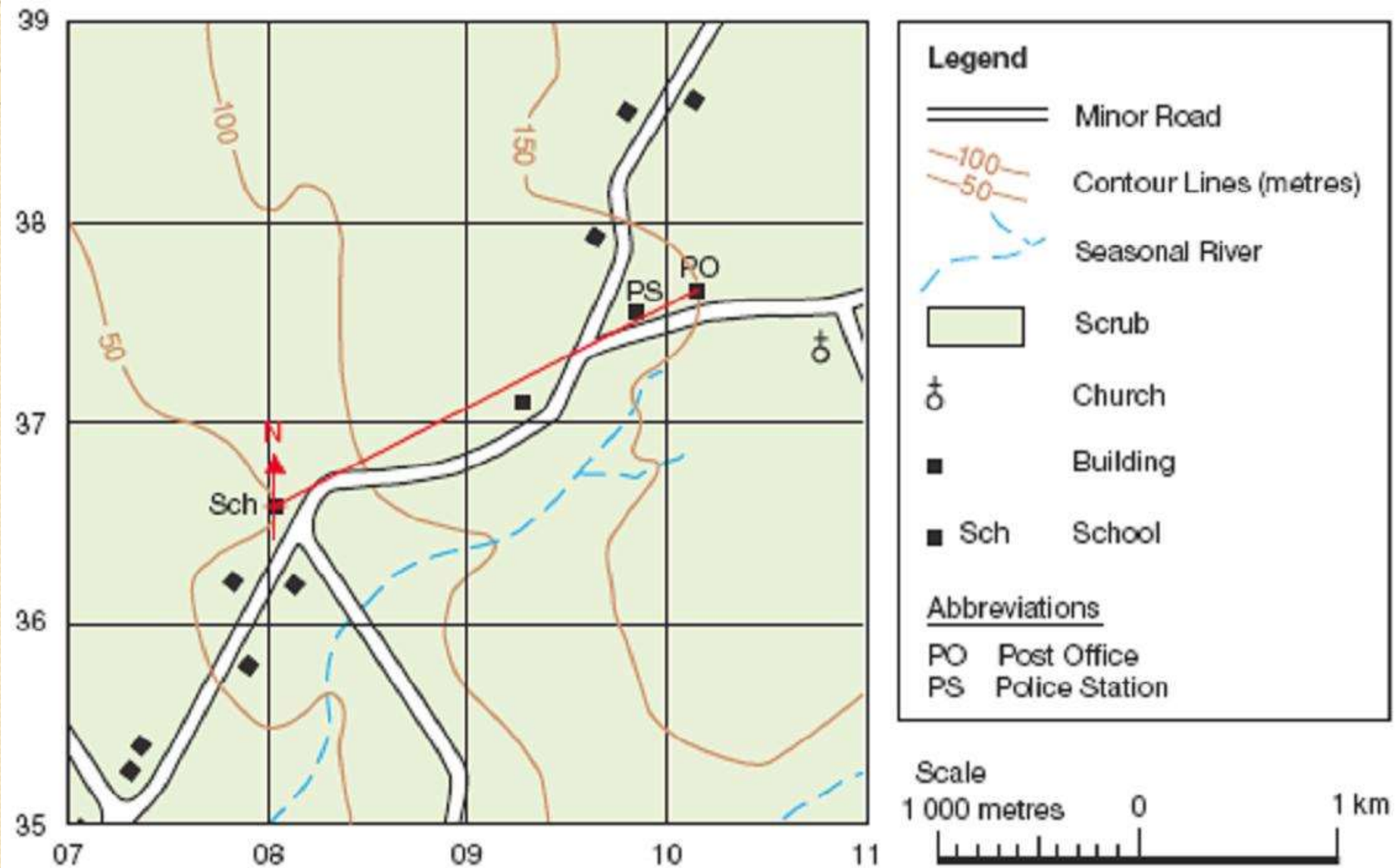
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Compass points and their bearing



Cont.

- Example



Cont.

- To determine **the direction of the post office from the school on the map**:
 - A. Locate the school and the post office on the map.
 - B. At the center of the school from which direction is measured, draw a line parallel to the true north direction as indicated by **the arrow indicating true north**.
 - C. Draw a line to connect the center of the arrow (school) to the center of the post office.
 - D. Determine the direction **assuming the top of the map is always the grid north**.
 - E. The direction of the post office from the school can be expressed in the following ways.
 - A. The post office is roughly **East-North-East** of the school or the post office bears East-North-East from the school.
 - B. The direction using compass bearing i.e., the direction from the school to the post office is **67.5°**.

Distance

- Distance may be measured between two given points on a map **using the scale of the map**. The types of distances that could be measured on the map are:-
 - A. Air route distance which connects points along a straight line;
 - B. Irregular or bending distance such as rivers, roads and railway lines.
 - C. Field distance, which considers the effect of altitude difference

Cont.

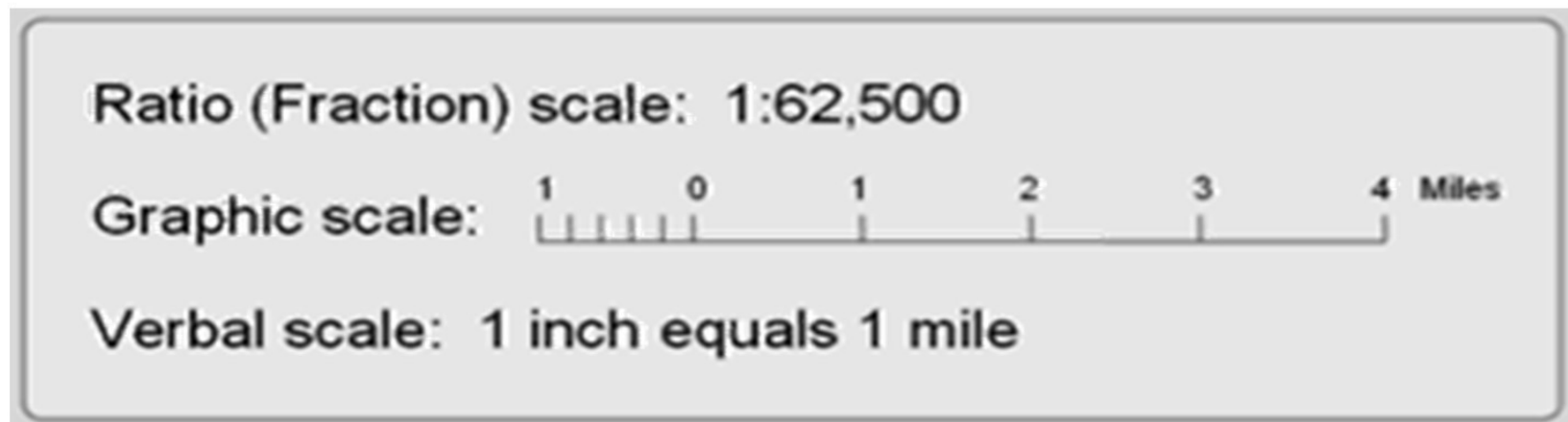
- **A scale is the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.**

$$\frac{\textit{Map Distance}}{\textit{Actual or Ground Distance}}$$

Cont.

✓ It can be expressed as;

- ✓ **Representative/Ratio/fraction scale** **1: 24,000**
- ✓ **statements/verbal scale,** **1 cm to 24 km**
- ✓ **Linear/graphic scale.**



- Example
- A straight line of 650 meters is measured on the ground. This line is to be plotted onto a map scale of 1:2500. What is the length of the line on the map?

$$\frac{1m}{650} = \frac{100cm}{?}$$

$$\frac{650m \times 100cm}{1m} = 65000cm$$

$$Scale = \frac{Map\ distance}{Ground\ distance} = \frac{1cm}{2500cm} = \frac{MD}{65000cm}$$

$$= 2500m (MD) = 65000cm = \frac{2500cm}{2500} MD = \frac{65000cm}{2500} = 26cm$$

Area

- There is a semi circular figure on a map whose diameter is 12cms. The map scale is found to be 1:50, 000. What will be the actual area of this semi circular figure?

$$\text{Scale} = \frac{MD}{GD} = \frac{1cm}{50000} = \frac{12}{GD}$$
$$= 50000 (12) = GD$$

$$600000cm = GD$$

$$\frac{600000cm}{100000cm} = GD = 6km$$

$$\text{radius} = \frac{6km}{2} = 3km$$

$$\text{Area of semi circle} = \frac{\pi 3^2}{2} = \frac{3.14 \times 3^2}{2}$$
$$= \frac{3.14 \times 9}{2} = \frac{28.26}{2} = 14.13km^2$$

Importance.....

- ✓ Maps are powerful tools;
 - ✓ for making spatial analysis of geographical facts of areas represented.
- ✓ Maps are useful for giving;
 - ✓ location of geographical features by different methods such as;
 - ✓ grid reference,
 - ✓ place naming etc.

Importance...

- ✓ Maps are used on disciplines like;
 - ✓ land use planning,
 - ✓ military science,
 - ✓ aviation,
 - ✓ tourism,
 - ✓ marine science, etc.
- ✓ Map makes **storage of the geographical data** of areas represented.
- ✓ Maps are potentially used to asses'
 - ✓ reliable measurements of the geographical features.
 - ✓ The measurements can be of
 - ✓ area size,
 - ✓ distance etc

Types of Map

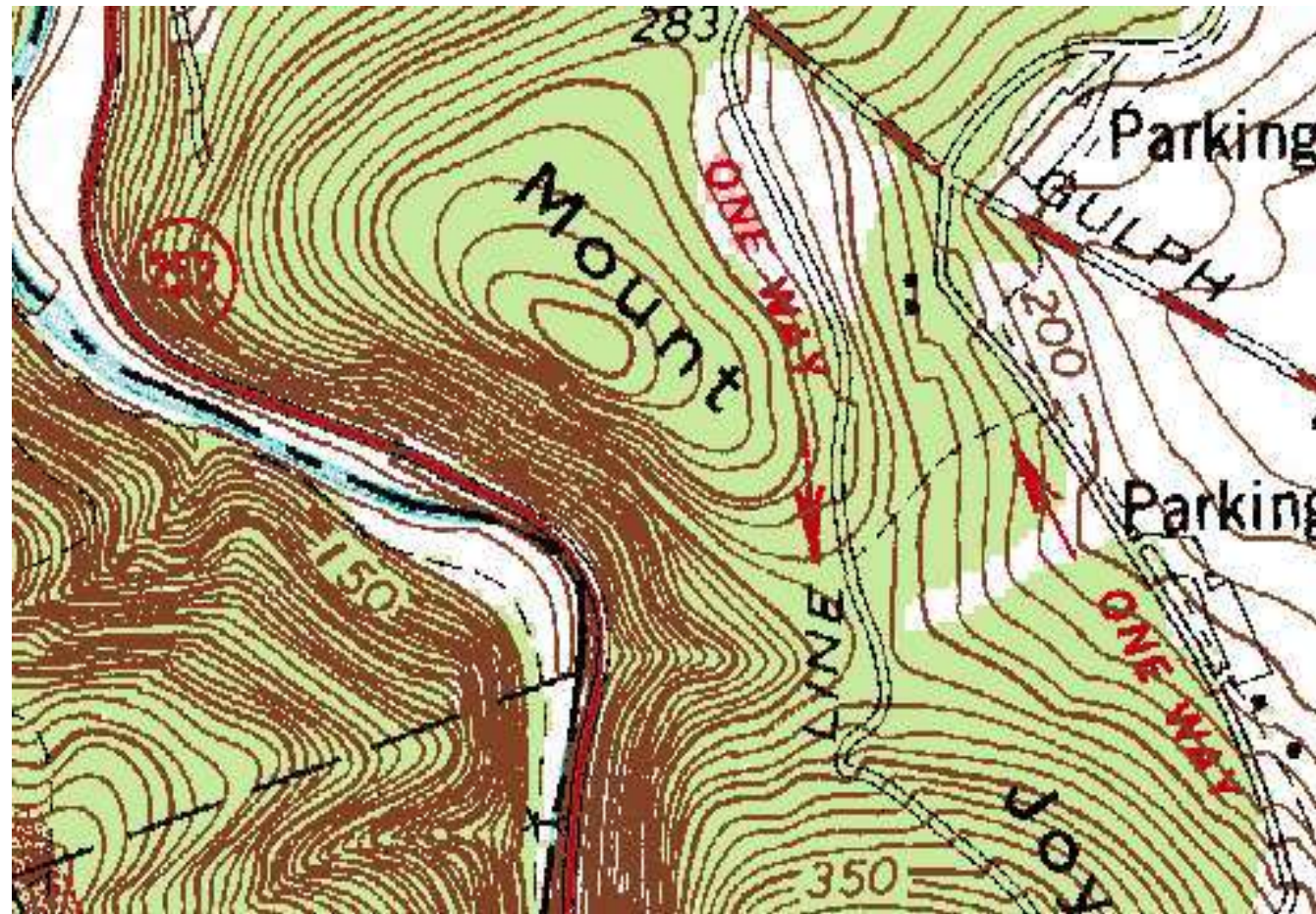
- There are many types of maps based on
 - ✓ the purpose and
 - ✓ Functions of the map.
 - ✓ Here **topographical** and **statistical** maps are considered.

A. Topographical maps:

Shows /depict/ **one or more natural and cultural features** of an area. Could be;

- ✓ small,
- ✓ medium or
- ✓ large scale depending on the size of the area represented.

Topography map



Types of Map

- ✓ Contents of topographical maps **depend** on
 - ✓ the purpose of a map,
 - ✓ scale of a map,
 - ✓ date of compilation, and
 - ✓ nature of the land represented.

B. Special purpose/statistical maps:

- ✓ These are maps, which show **distribution** of different aspects such as;
 - ✓ temperature,
 - ✓ rainfall,
 - ✓ settlement,
 - ✓ vegetation etc.

MEAN ANNUAL RAINFALL AND TEMPERATURE DISTRIBUTION OVER ETHIOPIA

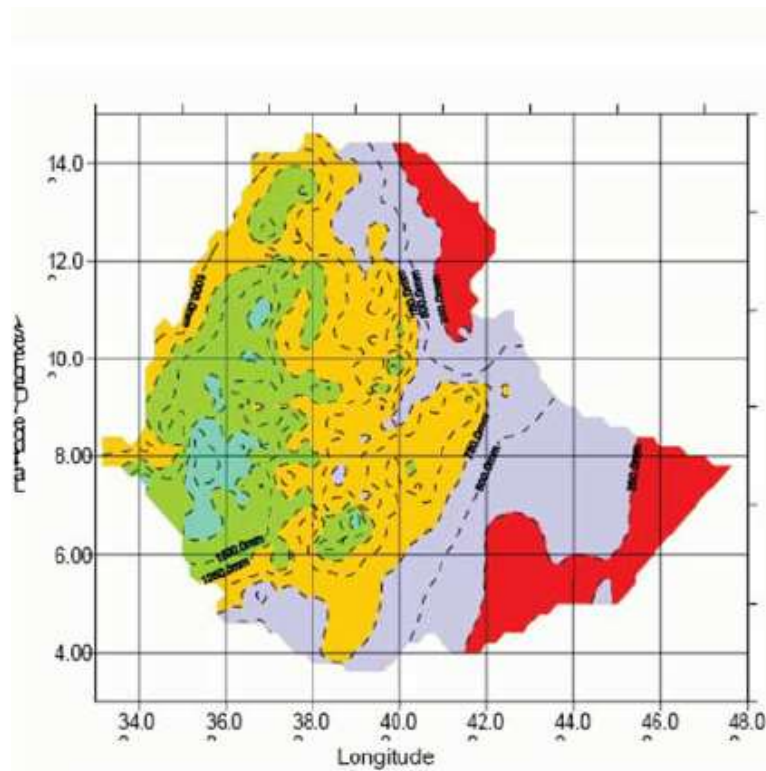


Figure ? Cumulative Mean Annual Rainfall (mm)

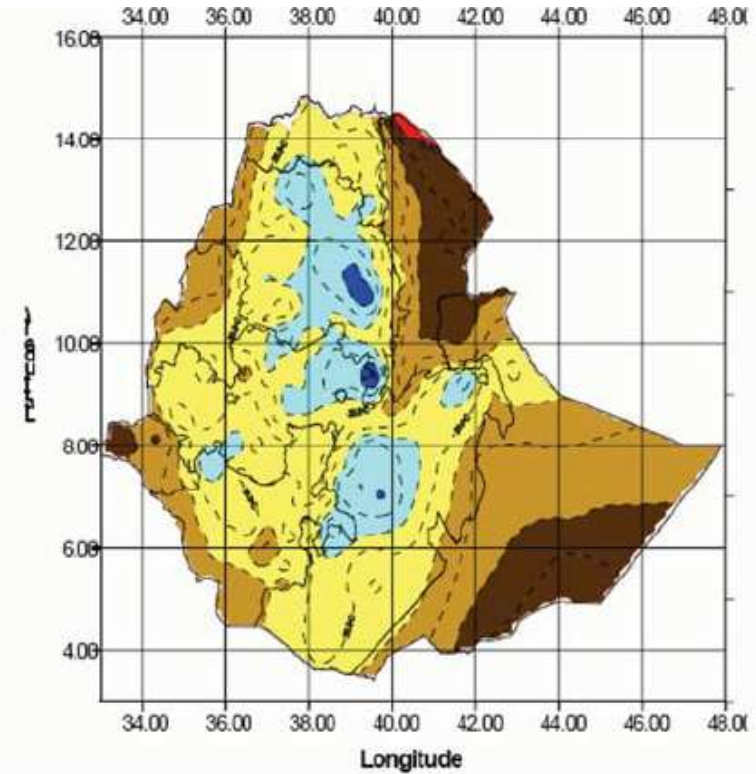
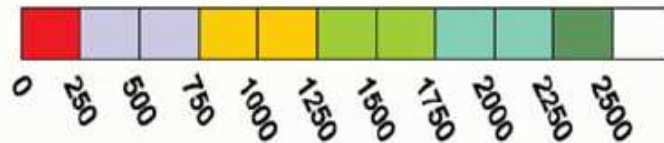
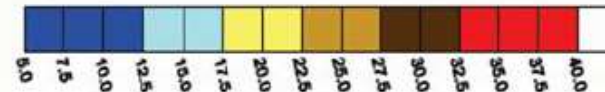


Figure ? Daily Mean Temperature for the Year (°C)



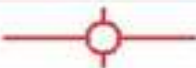
Marginal Information on Maps (Elements of Maps)

- ✓ It is shown on a map to enable the **reading** and **interpretation** of the geographical information of an area represented. This includes:
 - ✓ **a. Title:**
 - ✓ It is the heading of the given map which tells what the map is all about.

b. Key (legend):

It is the list of all conventional symbols and signs shown on the map with their interpretation.

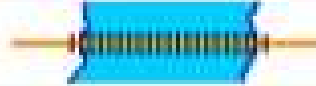
Transportation Features - Roads and Trails

Feature Name	Symbol
Road - hard surface, all season	dual highway 
Road - hard surface, all season	more than 2 lanes  2 lanes  less than 2 lanes 
Road - loose or stabilized surface, all season	2 lanes or more  less than 2 lanes 
Road - loose surface, dry weather	
Rapid transit route, road	
Road under construction	
Vehicle track or winter road	
Trail or portage	
Traffic circle	
Highway route number	

UBO map symbols

	Airport - Domestic		Private College		Lookout - 180° view		Scout Hall
	Airport - International		Public College		Lighthouse		Service Station
	Ambulance Station		Express Post		Masonic Centre		Shopping Centre
	Barbecue		Fire Station		Memorial / Monument		Swimming Pool
	Cyclway		Golf Course		Motel		Taxi Stand
	Boat fueling point		Guide Hall		Picnic		Telephone
	Boat Ramp		Hospital		Place of Worship		Toilets
	Bowling Club		Hotel		Playground		Weighbridge
	Bus Stop		Information Centre		Police Station		Wineries
	Camping Area		Kindergarten		Post Office		Distance from GPO
	Caravan Park		Landmarks		Private School		Roundabout
	Car Park		Library		Public School		Traffic Lights
			Lookout - 360° view				

Other Transportation Features - Tunnels, Bridges, etc.

Feature Name	Symbol
Tunnel; railway, road	
Bridge	
Bridge; swing, draw, lift	
Footbridge	
Causeway	
Ford	
Cut	
Embankment	
Snow shed	
Barrier or gate	

Marginal...

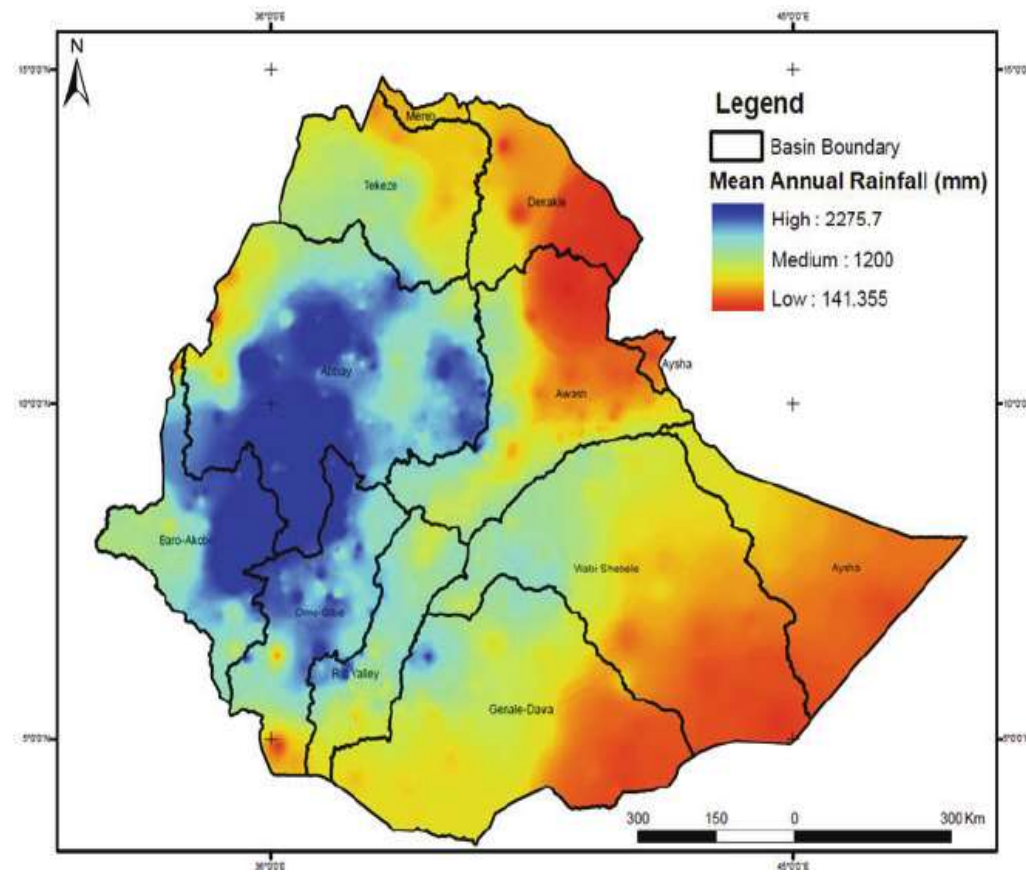
c. Scale:

- ✓ It is the ratio b/n the distance on the map and the actual ground distance.
- ✓ Scales enable the map user to interpret the ground measurement like road distance, areal sizes, gradient etc.
- ✓ It can be expressed as;
 - ✓ **representative fraction, 1: 24,000**
 - ✓ **statements/verbal scale, and 1 cm to 24 km**
 - ✓ **linear (graphic) scale.**



North arrow

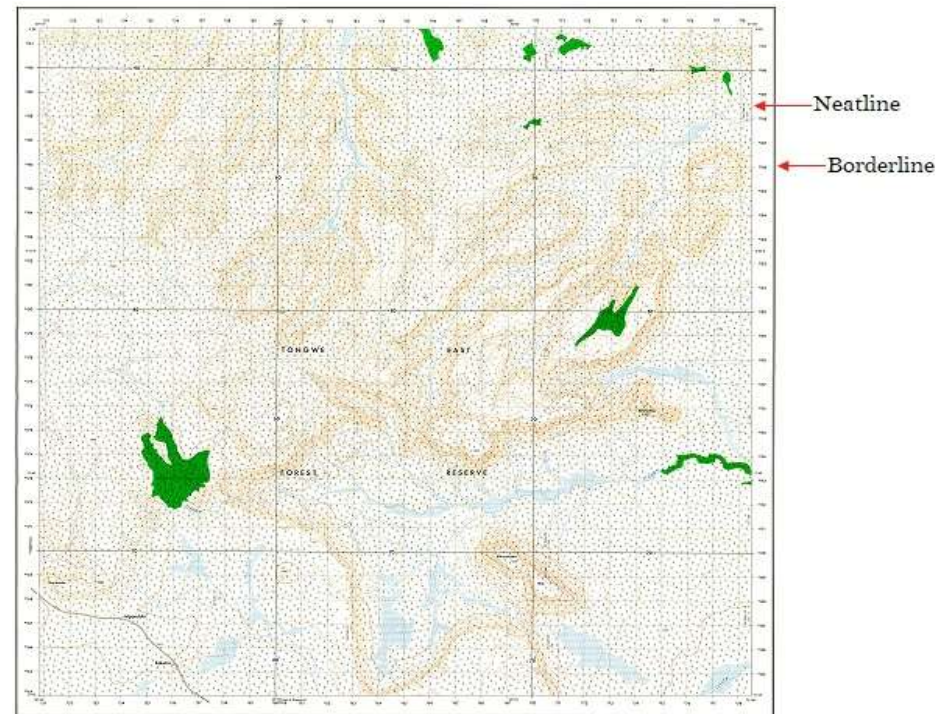
- ✓ It is indicated with the **north direction** on a map; used to know the other important directions of the mapped area like east, west, and south.



Cont.

E. Margin:

- ✓ It is the frame of the map. It is important for showing the end of the mapped area.



F. Date of compilation:

- ✓ It is a date of map publication.
- ✓ Enables users to realize whether the map is **updated/outdated**.

Basic Principles of Map Reading

- ✓ Map Readers must have ideas about the symbol and the real World (landscapes).
- ✓ Every map symbol must be **visualized** by the reader to read a map.
- ✓ The first symbols introduced should be those, which refer to landscape features of which the reader already has some images.
- ✓ secondly, knowledge of directions is an important principle in reading maps.

Basic skills...

- ✓ A basic functions of maps is to orient ourselves and **locate places** on the earth.
- ✓ Unless a reader knows the basic directions, he or she may not use a map effectively.
- ✓ Before locating features using a map, north (the north arrow) should be determined and the readers should have practice in finding this direction.

Thank you for today