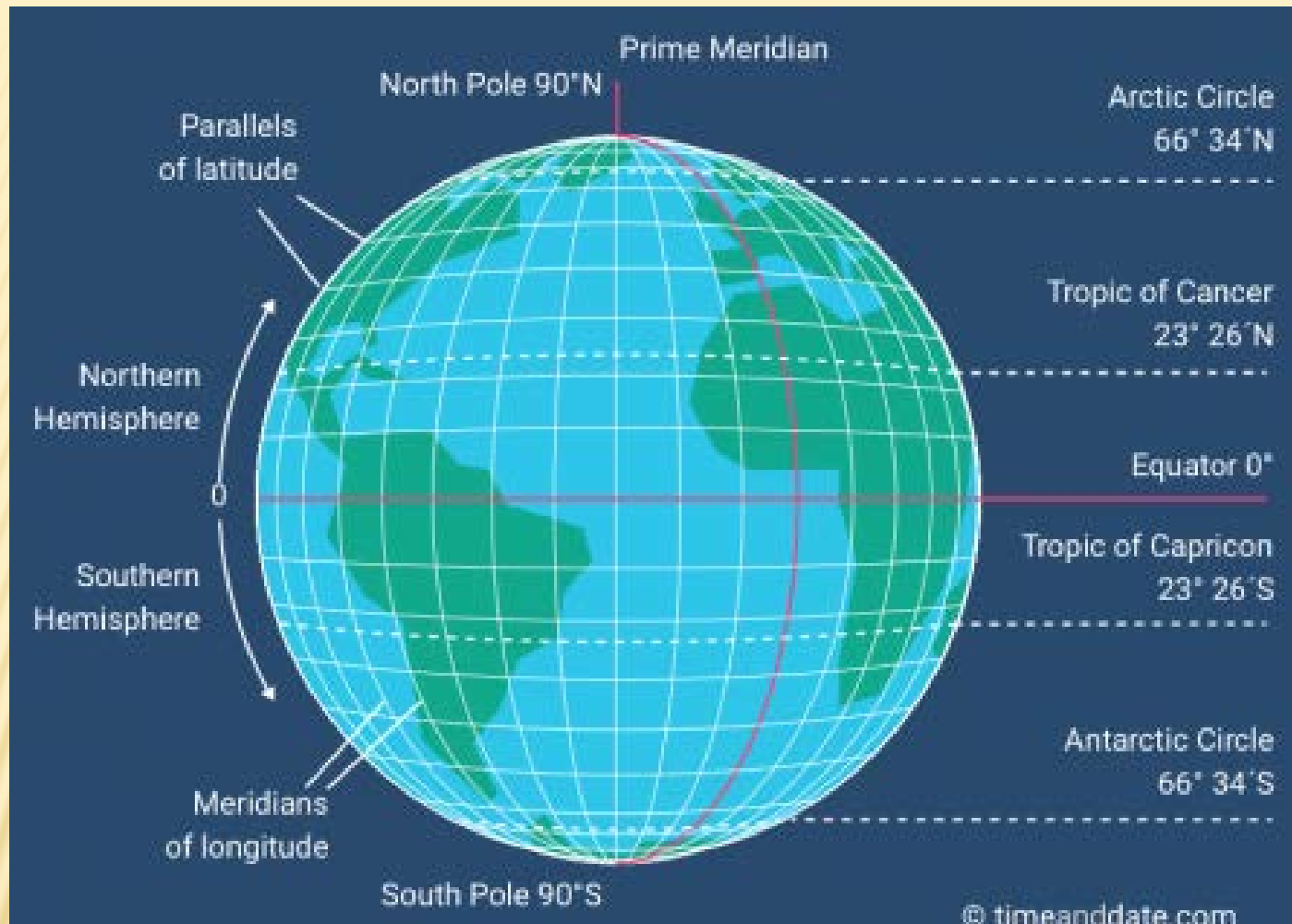




(GEOGRAPHY) LESSON -2

LATITUDES AND LONGITUDES

INSTRUCTIONS



- ✖ Read the slides carefully
- ✖ Sit in a comfortable area with no clutter around
- ✖ Keep notebook, book, pencil box (with pen, pencil, eraser, etc.) close at hand
- ✖ Read and re-read till you understand
- ✖ Take a note of the Exercises
- ✖ You do not need a new notebook to take notes, solve Exercises or complete Worksheets
- ✖ Just use available resources at home
- ✖ Study with full concentration.

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- + Parallels or Latitudes– [Slide 6](#)
- + Special Parallel or Equator – [Slide 7](#)
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- + The Great Circles – [Slide 9](#)
- + Special Meridian- The Prime Meridian – [Slide 10](#)
- + Latitudes and Longitudes – [Slide 11](#)
- + Locations on the Globe- [Slide 12, 13](#)
- + Special Lines on the Globe – [Slide 14](#)
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- + Special Circles – [Slide 16](#)
- + Hemispheres – [Slide 17](#)
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- ✖ Differences between
Local Time and Standard Time – [Slide 24](#)
- ✖ Time Zones of India – [Slide 25](#)
- ✖ Heat Zones of the World – [Slide 26](#)
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- ✖ Exercise Questions – [Slide 28 – 31](#)
- ✖ Other Important Terms – [Slide 32](#)

INTRODUCTION- GLOBE AND MAP

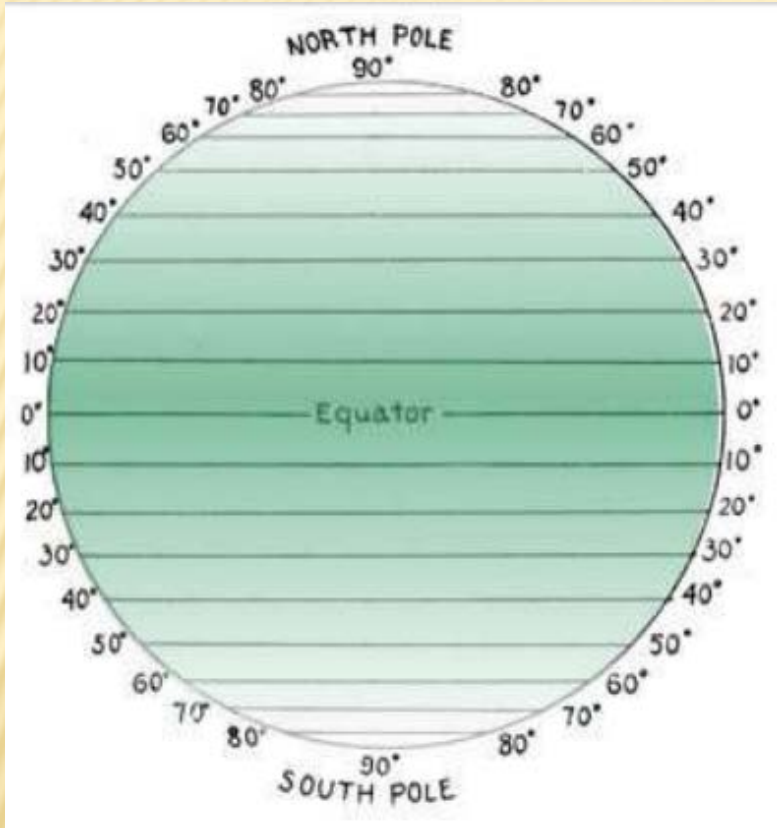
- ✗ A **globe** is a spherical (3 dimensional) model of **Earth**.
- ✗ A **map** is a diagrammatic representation, drawn to scale and on a flat surface, to show an area of land or sea showing physical features, cities, roads, etc.
- ✗ **Globe** or **Map** is used to find out the shape and size of the continents.
- ✗ The meaning of '**globe**' is a 'model of earth'. It is used to locate place, see sea route, air route, etc. We can locate continent, countries, oceans, rivers, cities, etc.



- A map is a representation of the Earth's features drawn on a flat surface.
- Maps use symbols and colours to represent features of an area, simplifying the real world.



PARALLELS OR LATITUDES



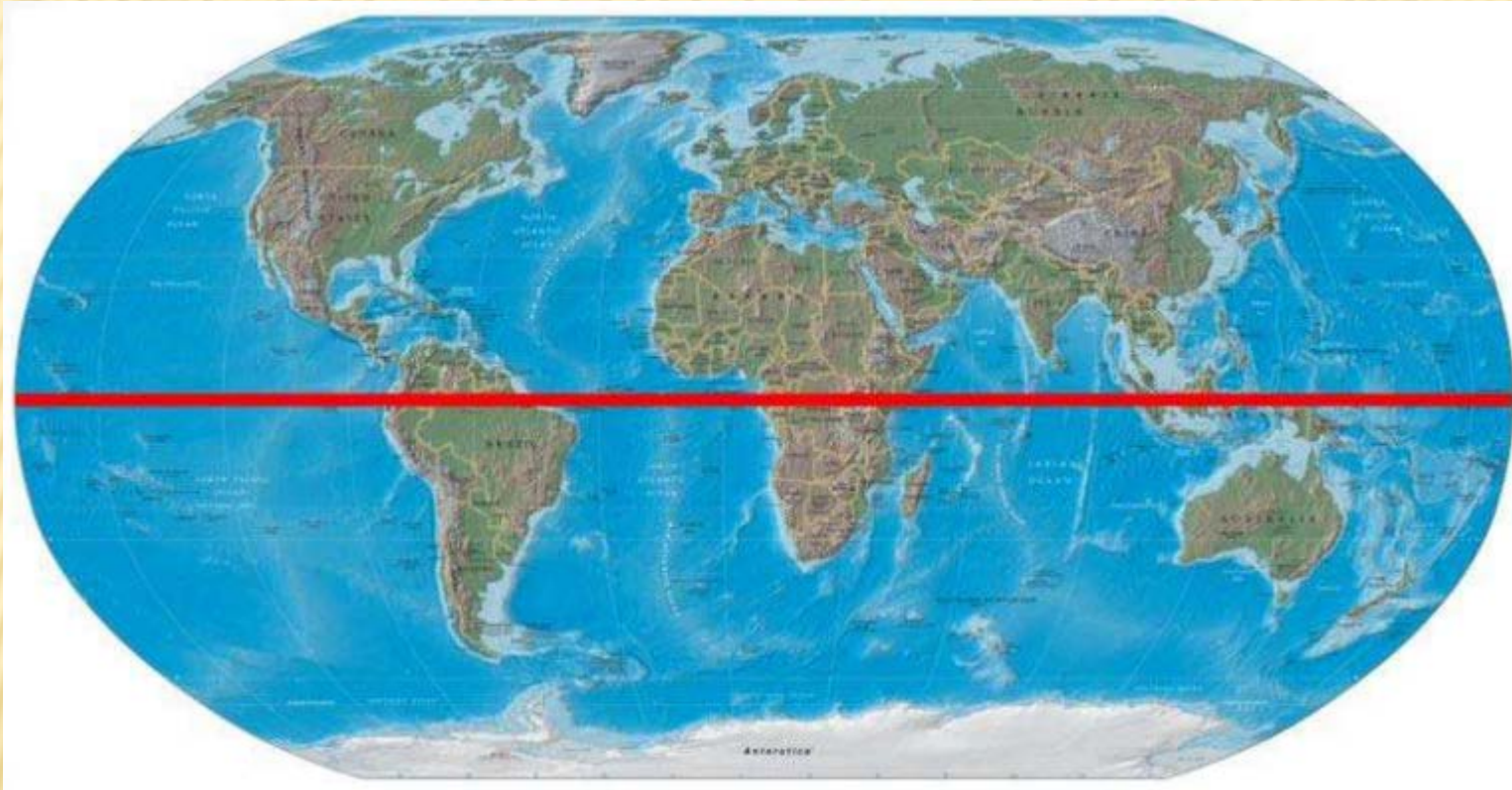
Parallels on the Globe

- ✗ ‘Latitude’ is defined as a measurement of distance in degrees, North and South of the Equator.
- ✗ The word latitude is derived from the Latin word, “**latus**” meaning “**wide.**”
- ✗ There are 90° of latitude from the equator to each of the poles, North and South.
- ✗ Latitude lines are parallel, that is they are the **same distance apart.**
- ✗ These lines are **horizontal** lines.

North and South Latitudes

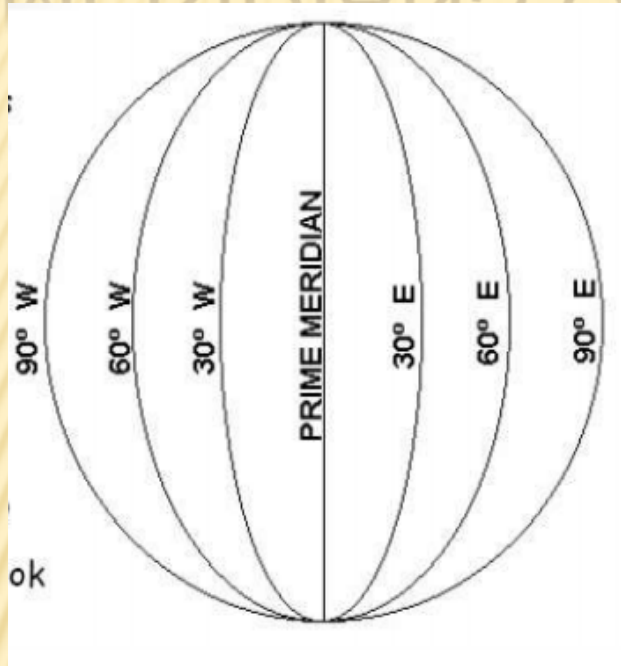
- ✗ Positions on latitude lines **above** the equator are called “**North**” and are in the **Northern hemisphere.**
- ✗ Positions on latitude lines **below** the equator are called “**South**” and are in the **Southern hemisphere.**

SPECIAL PARALLEL- EQUATOR

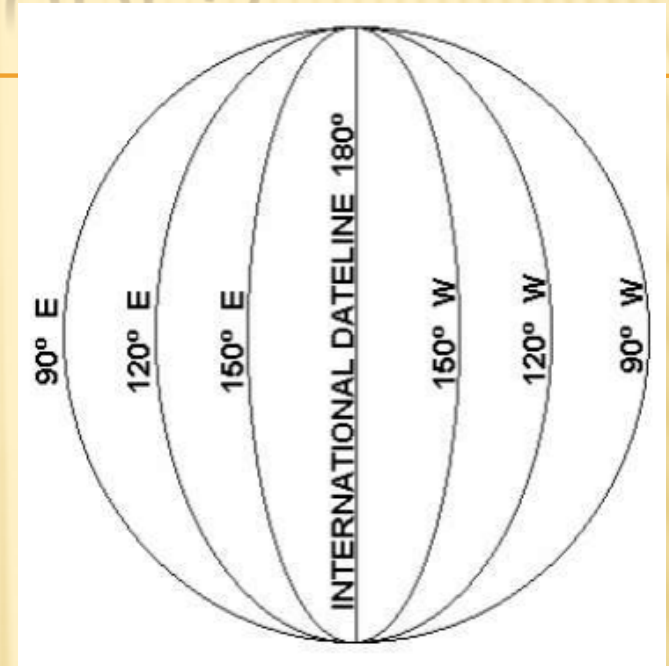


- ✖ The equator is the longest of all lines of latitude
- ✖ It divides the earth into two equal halves.
- ✖ It is measured as 0° (Zero degree) latitude.

MERIDIANS OR LONGITUDES



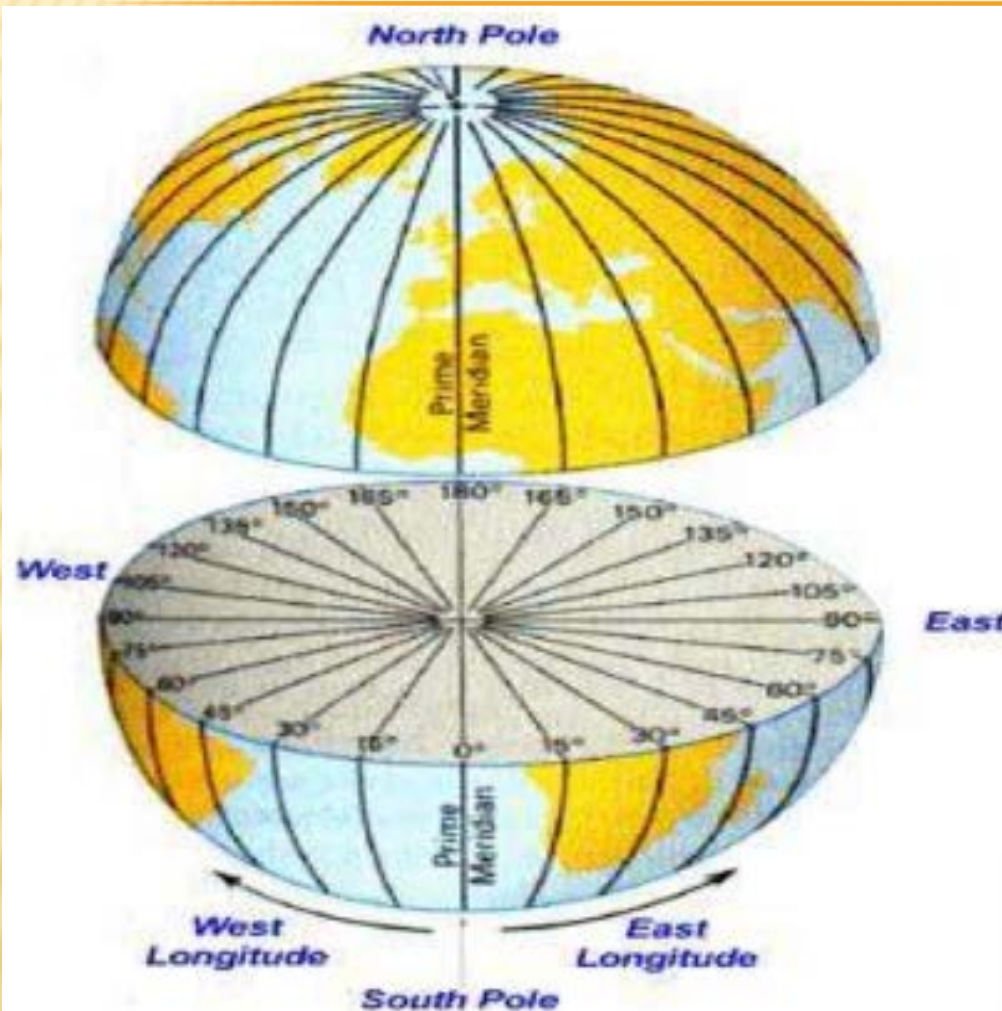
One Side of the Globe



Other Side of the Globe

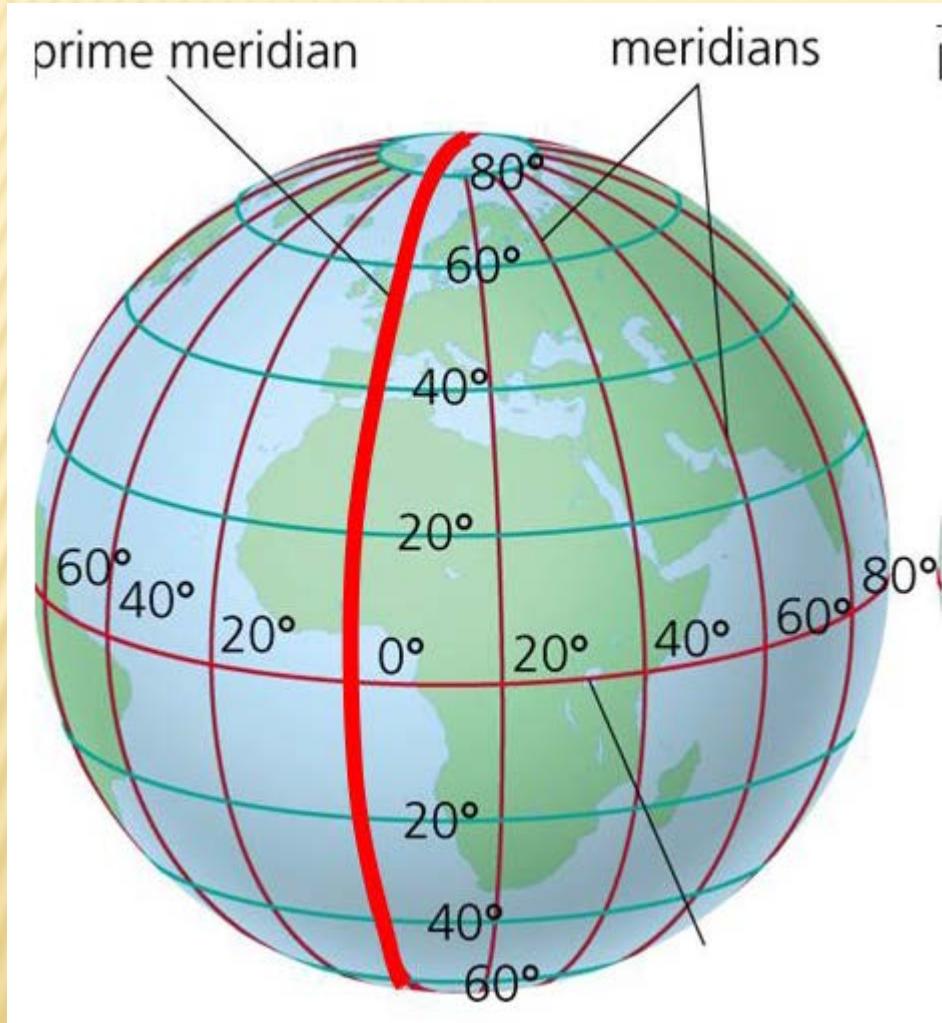
- ✗ Longitude lines are the **vertical** lines drawn on a map. They run from North to South.
- ✗ **Longitude is defined as measurement of distance in degrees East or West of the 'Prime Meridian'.**
- ✗ The word longitude is derived from the Latin word, '**longus**', meaning '**length.**'
- ✗ All the longitudes pass through 'North Pole' and 'South Pole'. (They make the earth look like peeled orange.)
- ✗ The starting longitude is 0° and is known as the '**Prime Meridian**'.
- ✗ •The extreme longitude is 180 ° and is called the '**International Date Line**'.

THE GREAT CIRCLES



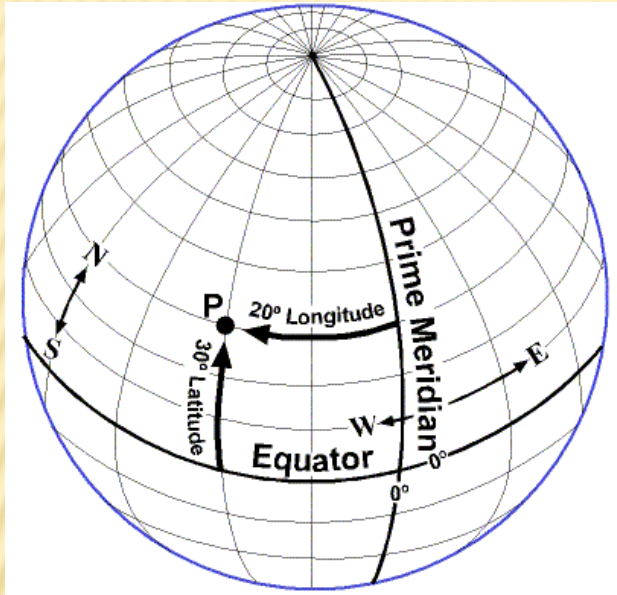
- ✗ A '**Great Circle**' is the largest circle that can be drawn on any given sphere.
- ✗ A '**Great Circle**' is any circle that encircles the Earth and passes through the center of the Earth.
- ✗ A '**Great Circle**' always divides the Earth in half, thus **the Equator** is the only a great circle in the latitudes.
- ✗ All **lines of longitude** are '**Great Circles**'.

SPECIAL MERIDIAN- PRIME MERIDIAN

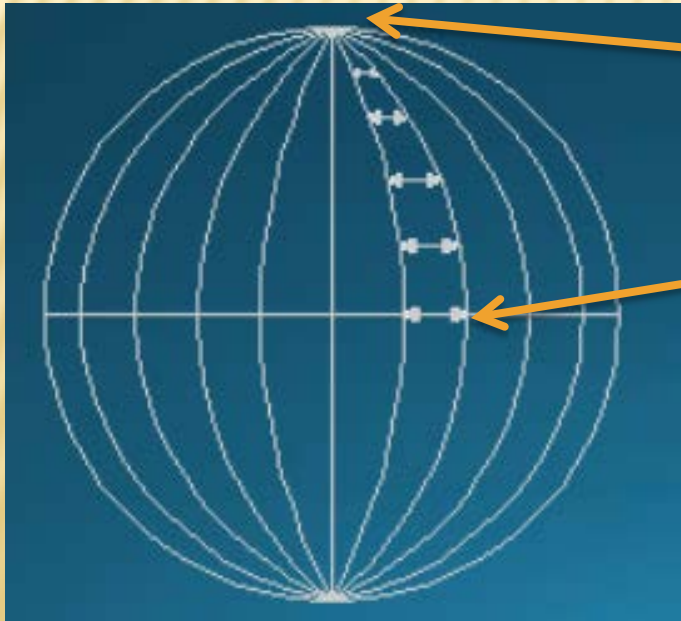


- ✗ The **Prime Meridian** divides the earth into two equal halves, length wise.
- ✗ It is also known as 0° longitude. It is an imaginary line that runs through may countries. Some of them are as follows:
 - + Greenwich, in United Kingdom,
 - + France,
 - + Spain,
 - + Western Africa, and
 - + Antarctica.

LATITUDE AND LONGITUDE



- ✗ A combination of latitude and longitude is required to locate a particular point on the globe.
- ✗ **Meridians** are farthest apart at the equator and **closest** at the **poles**.
- ✗ The more we get near the poles, the distance between two meridians decreases.



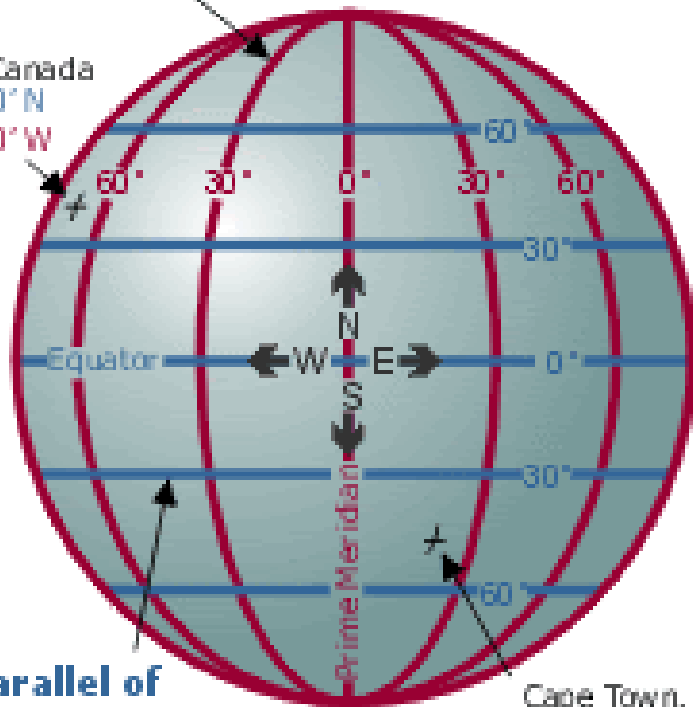
The **distance** in kilometers of **1° of longitude** varies **from** a minimum at the **poles and** maximum at the equator, **to a**.

At the equator, covers more length and so the approximate length of 1° is approximately 111 km

LOCATIONS ON THE GLOBE

Meridian of LONGITUDE

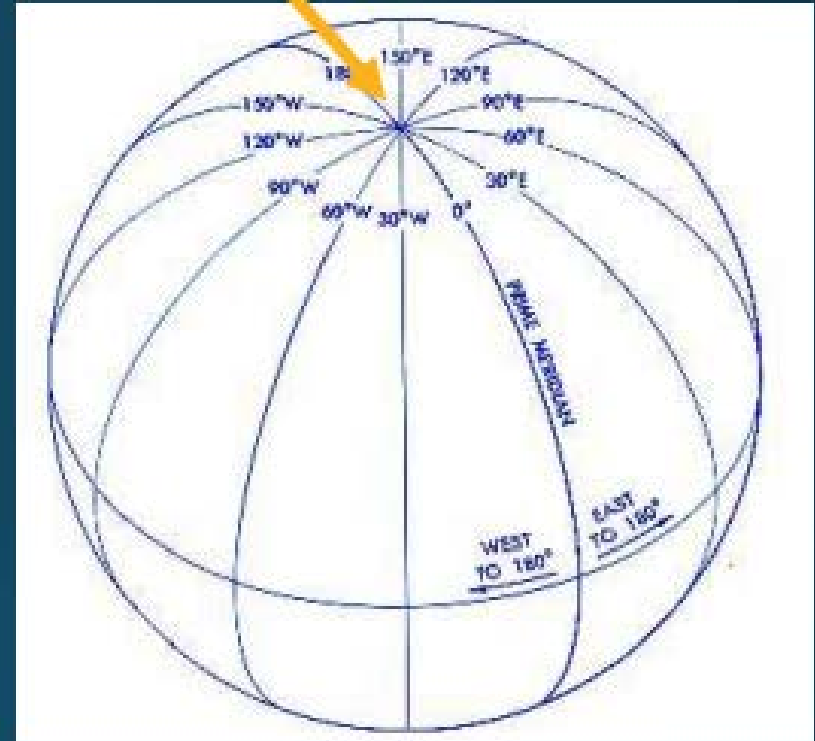
Toronto, Canada
 $43^{\circ} 40' \text{ N}$
 $79^{\circ} 20' \text{ W}$



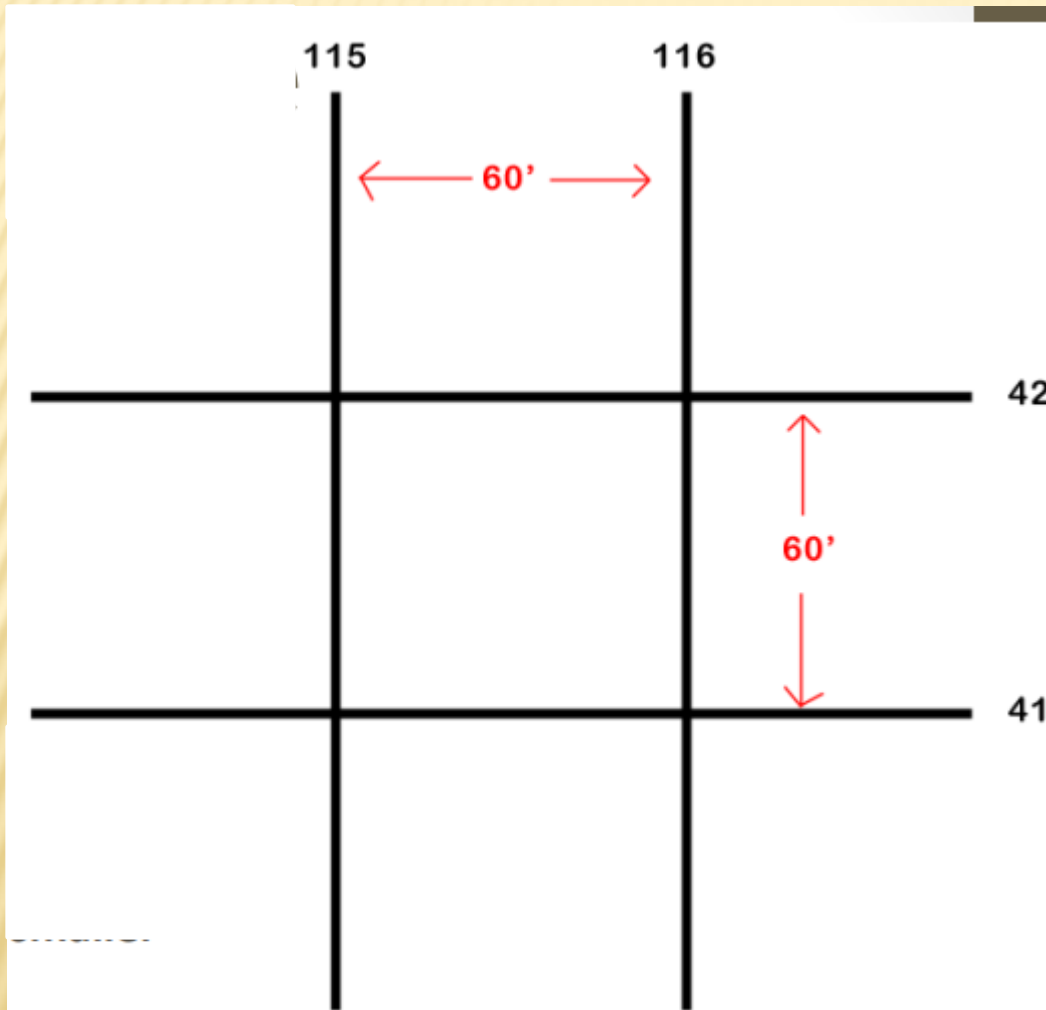
Parallel of LATITUDE

Cape Town, S. Africa
 $33^{\circ} 9' \text{ S}$
 $18^{\circ} 30' \text{ E}$

'Point of Convergence' at the Poles



MEASUREMENTS ON THE GLOBE



- ✗ When locating points that lie between two adjacent latitudes or longitudes (Example: between 41°N and 42°N) a smaller unit is desired.
- ✗ •A degree of spacing is made up of 60 smaller units called **Arcminutes**.

So, $1^{\circ} = 60'$

Or $\frac{1}{2}^{\circ} = 30'$

$\frac{3}{4}^{\circ} = 45'$

SPECIAL LINES ON THE GLOBE

MERIDIANS

Prime Meridian

International
Date Line

PARALLELS

Arctic Circle

Tropic of Cancer

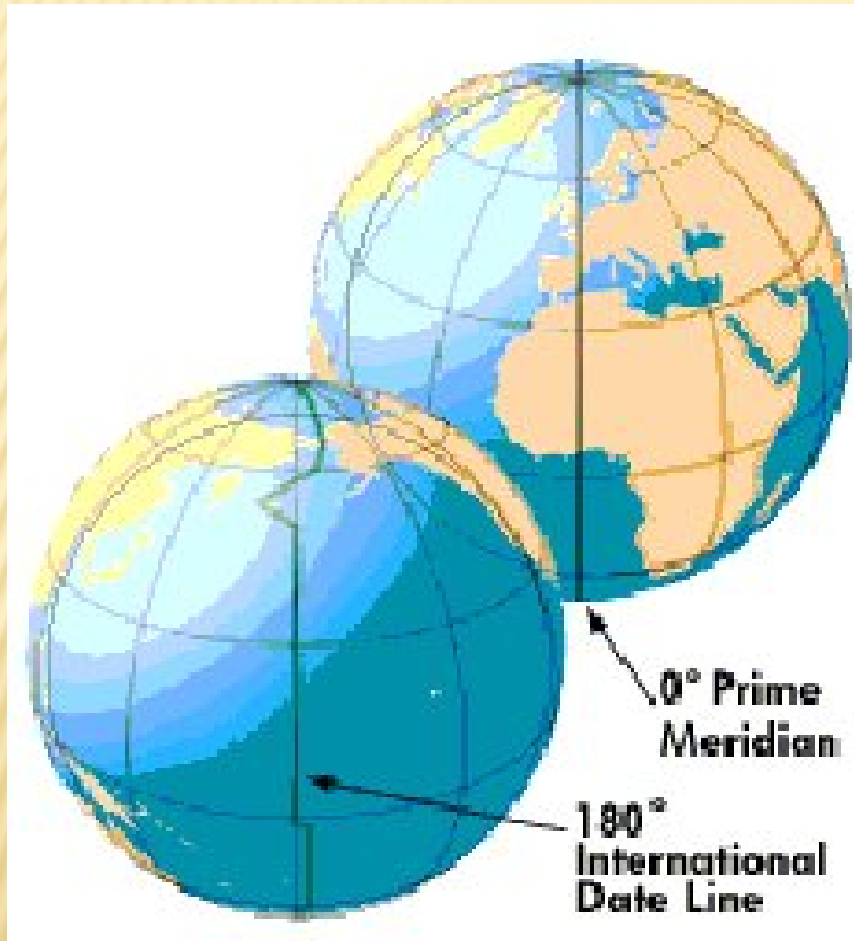
Equator

Tropic of Capricorn

Antarctic Circle



INTERNATIONAL DATE LINE

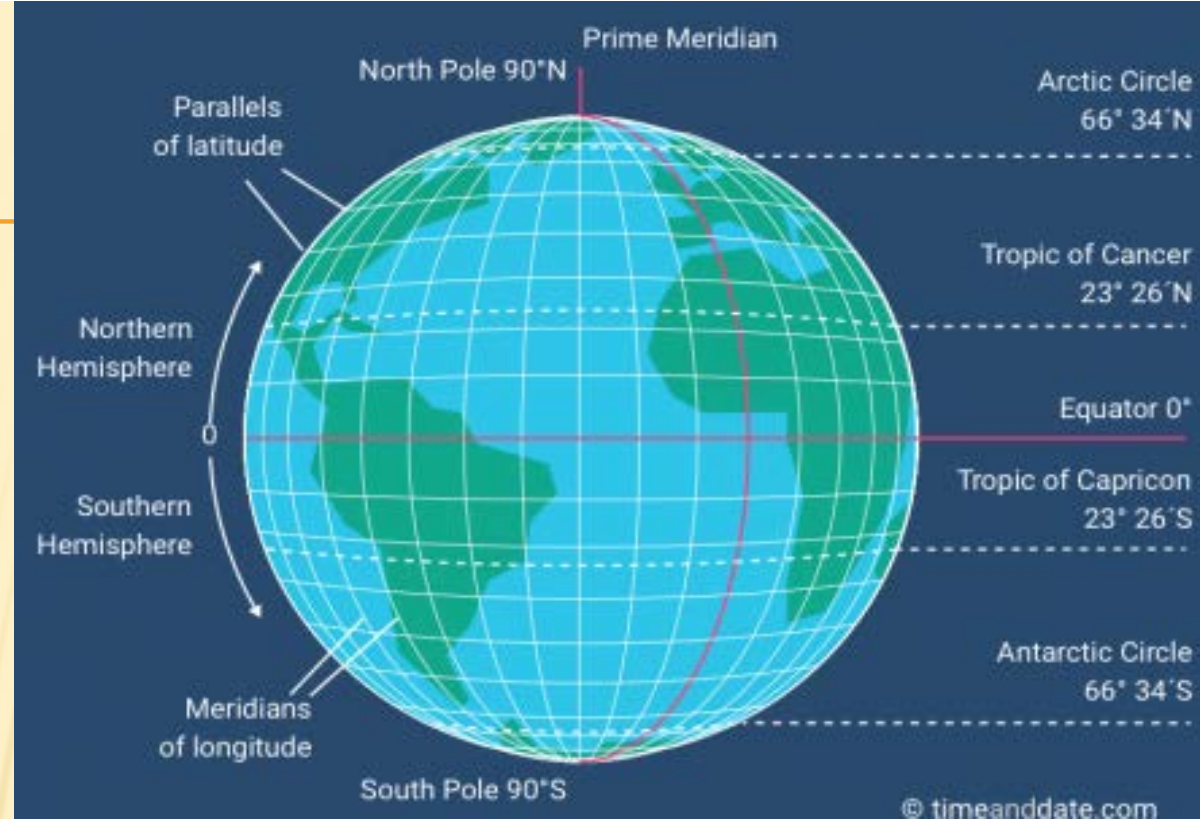


- ✖ There are 180 lines of longitude on each side of the Prime Meridian.
- ✖ But on the opposite side of the Prime Meridian is 180° longitude.
- ✖ It is called the 'International Date Line.'

SPECIAL CIRCLES

Tropic of Cancer- it lies at $23\frac{1}{2}^{\circ}$ N of Equator. It marks the northernmost limit of the Sun's direct rays.

Tropic of Capricorn- it lies at $23\frac{1}{2}^{\circ}$ S of Equator. It marks the southernmost limit of the Sun's direct rays.



✗ **Arctic Circle-** it is located at $66\frac{1}{2}^{\circ}$ N of the Equator. It marks the northernmost limit of the Sun's slanting rays.

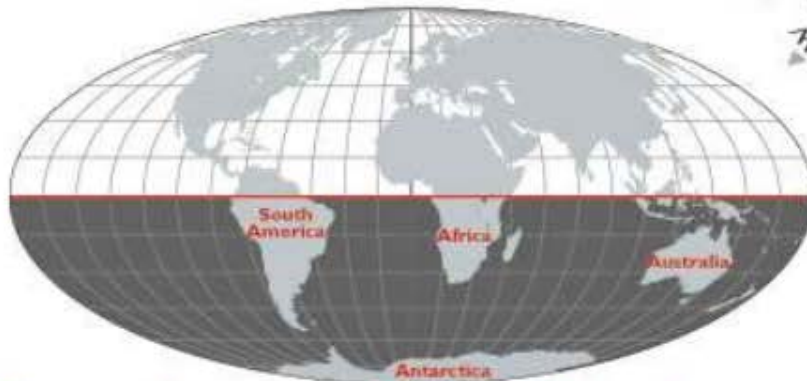
✗ **Antarctic Circle-** it is located at $66\frac{1}{2}^{\circ}$ S of the Equator. It marks the southernmost limit of the Sun's slanting rays.

HEMISPHERES

Northern Hemisphere



Western Hemisphere

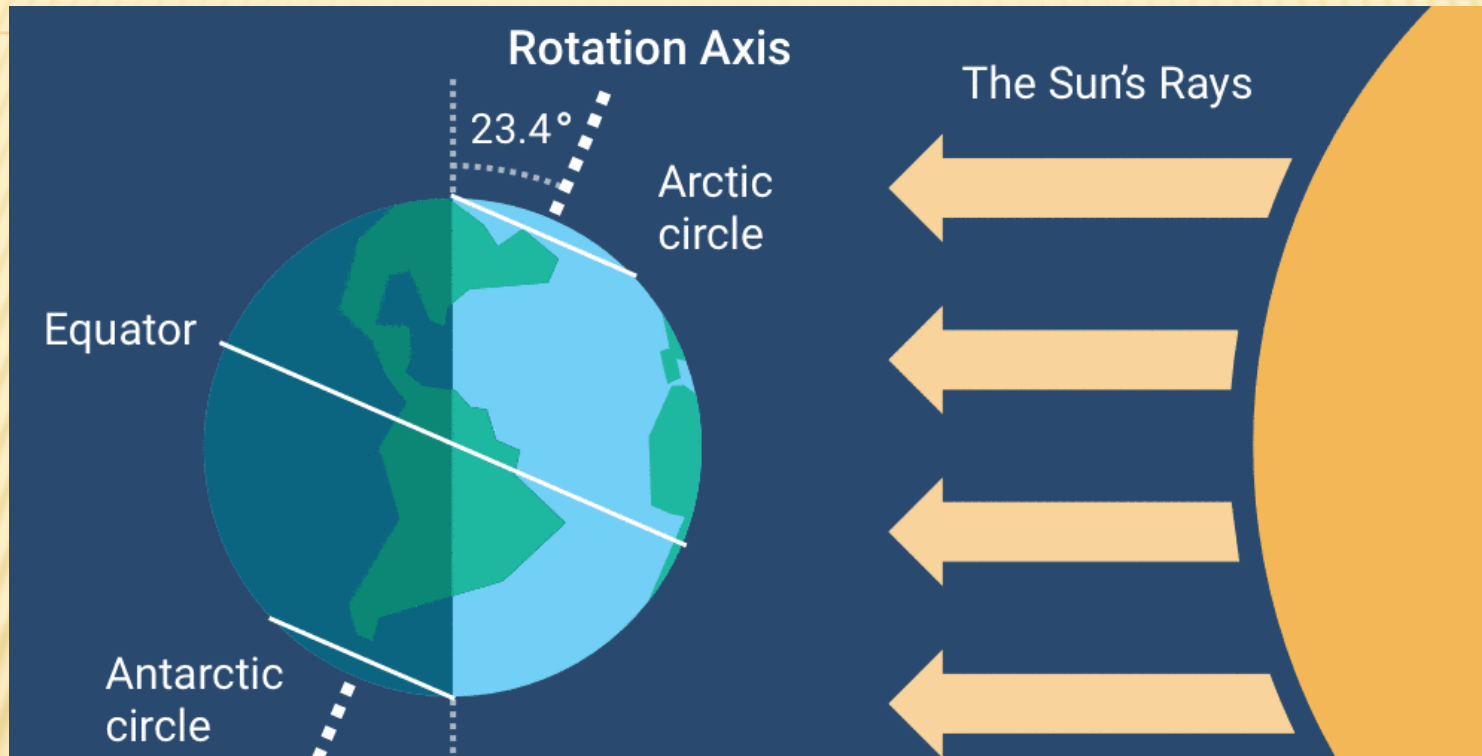


Southern Hemisphere

Eastern Hemisphere

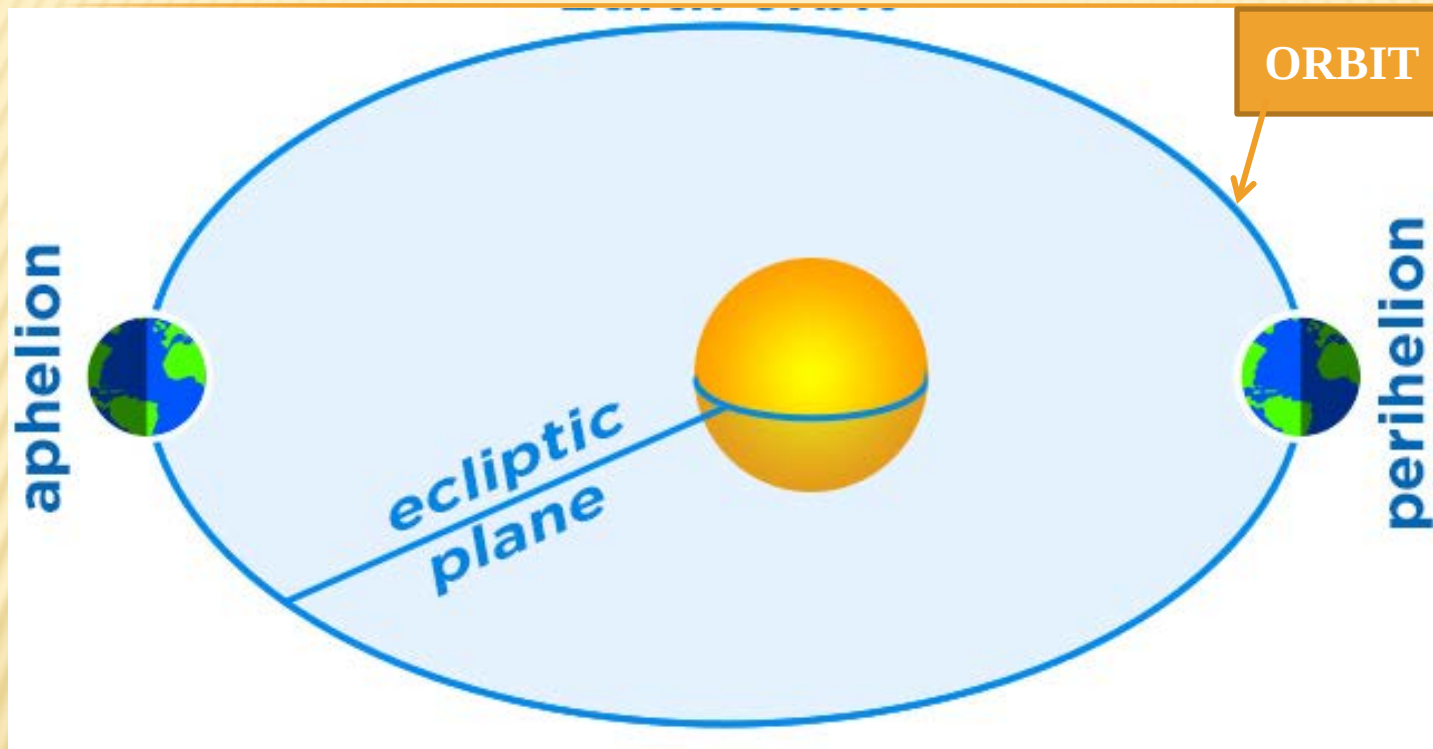
- ✘ Hemisphere- 'Half of a sphere', here, 'half of the Earth's globe.'

EARTH'S AXIS



- ✗ **Axis-** The **axis** is an imaginary line through the North and South Poles on which the Earth **rotates** or **spins**. The axis of Earth is '**tilted at $23\frac{1}{2}^{\circ}$ from vertical line**'. The Earth rotates on its **axis** once every 24 hours. This tilt of the Earth causes seasons.

EARTH'S ORBIT



Orbit- An **orbit** is a curved path that is taken by the Earth around the Sun. It is an imaginary line about which the Earth **revolves** or 'goes around the sun'. It takes the Earth one year, or $365 \frac{1}{4}$ days to complete one **revolution**. Earth has an **oval** or **elliptical shaped** orbit.

TIME ZONES



- ✗ To standardize the **time** of different places of the earth and prevent confusion during long travels, the earth was divided into **time zones**.
- ✗ This was done by creating **time zones** that expanded to 15° of longitude.
- ✗ **Time zone** is a region on globe where a standard time is followed for legal and commercial purpose.
- ✗ Time zones are divided on the basis of the boundaries of a country also but if the area of a country is large then it can also have different time zones within the country. E.g.- for Russia there are 11 Standard Times.
- ✗ India Standard Time (IST) is + 5:30 hours ahead of **Coordinated Universal Time (UTC)** or **Greenwich Mean Time (GMT)**.
- ✗ This time zone is in use during **Standard Time** in: Asia. **India Standard Time** is a **half-hour time zone**.
- ✗ Its local time differs by 30 minutes instead of the normal whole hour.

RELATION BETWEEN LONGITUDES AND TIME

- ✗ The Earth rotates 360° in about 24 hours.

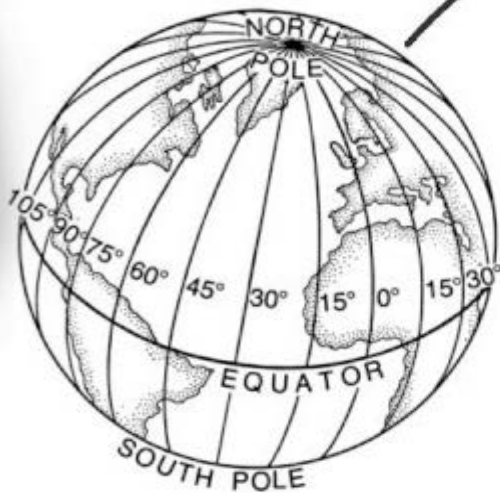
It means, $360^\circ / 24 = 15^\circ$

i.e. Earth rotates 15° in one hour. Also, 1 hour = 60 mins.

$= 15^\circ$ in 60 mins $= 15^\circ / 60 = 1^\circ$ in 4 mins.

- ✗ Thus, when it is 12 noon at Greenwich, the time at 15° **East** of Greenwich will be
 $15 \times 4 = 60$ mins. i.e. **1 hour ahead of GMT (Greenwich Meridian Time) or GMT + 1 hour = 1 p.m.**
- ✗ But, at 15° **West** of Greenwich, the time will be 60 mins. behind GMT or GMT - 1 hour i.e. it will be 11 a.m.
- ✗ Similarly, at 180° , it will be midnight 12 when it is 12 noon at Greenwich i.e. 12 hours ahead.

IST- INDIAN STANDARD TIME



India located east of
Greenwich at $82^{\circ}30'E$

⇒ 5 hours and 30 minutes
GMT

⇒ 7:30 p.m. in India

⇒ 2:00 p.m. noon in London

Remember: All places on a given meridian of longitude have the same local time.

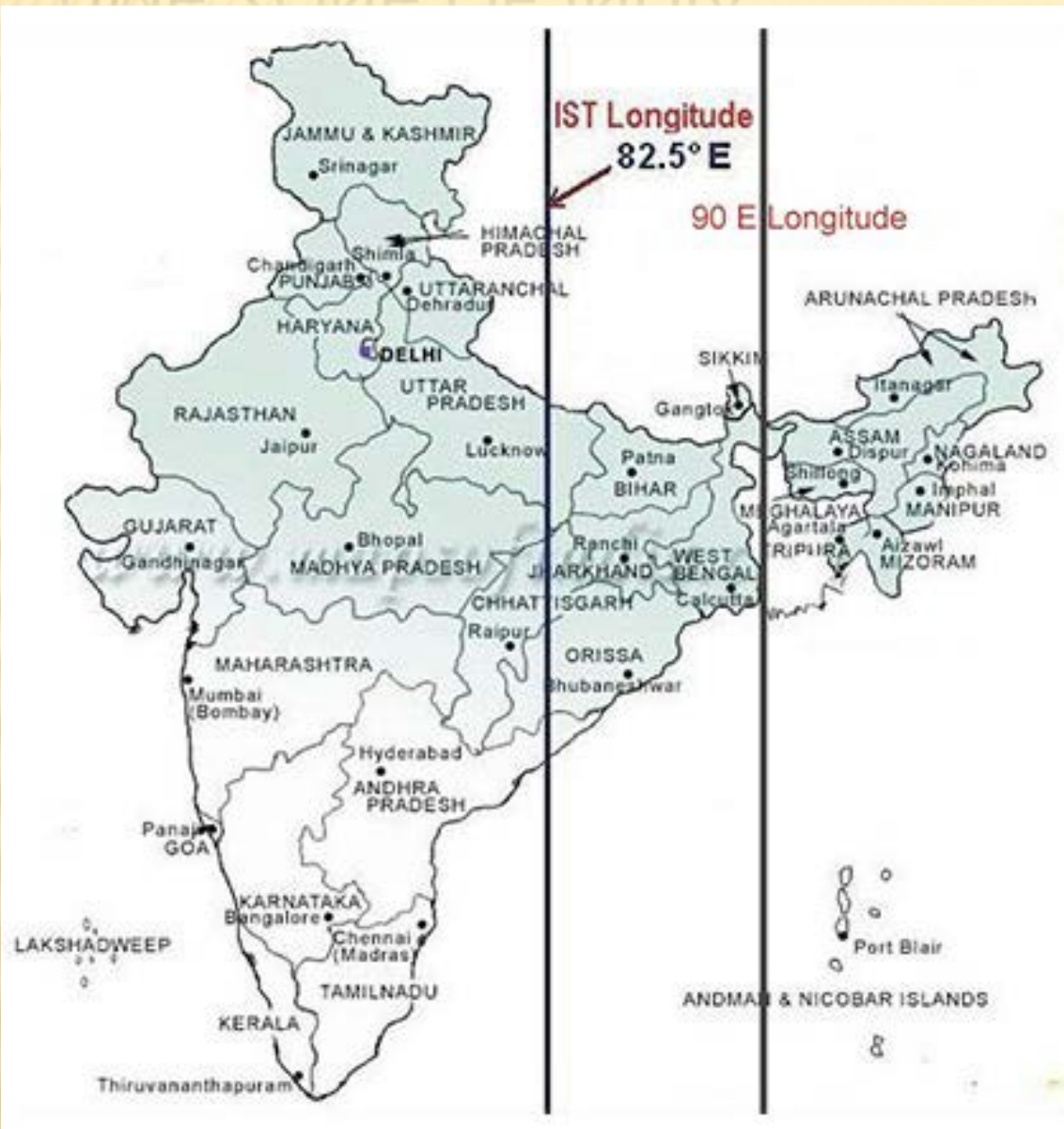
IST- INDIAN STANDARD TIME

- ✖ According to local time, there will a variation of about 1 hour and 45 mins. between Dwarka in Gujarat (Western part of India) and Dibrugarh, Assam (Eastern part of India). As a result, when people are travelling across India, they will find calculations and clashes in time, very confusing.
- ✖ India has adopted the meridian of $82 \frac{1}{2}^{\circ} \text{E}$ ($82^{\circ} 30' \text{E}$) as the 'Standard Meridian' for time calculations throughout the country.
- ✖ The Local Time for $82^{\circ} 30' \text{E}$ Meridian has been taken as the Standard Time for the whole country.
- ✖ The Earth has been divided into 24 time zones of 1 hour each and each time zone covers 15° of longitude.

DIFFERENCES BETWEEN LOCAL TIME AND STANDARD TIME

	Local Time	Standard Time
Meaning	Time determined under the basis of the sun's apparent movement.	This refers to the Fixed Time of several places in a given region that fall under the same Standard Meridian.
Variations	Changes with the change in longitudinal position.	Changes with the change in Time Zones of region or country.
Longitudinal Differences	Places within the same longitude have the same local time.	Places within the same longitude might have different standard time.
Computation of Time	Time computed in reference to the longitude of the place.	Time computed in reference to the time zone of the particular region.
Use	Used to handle time-bound events such as transportation schedules.	Used to get rid of the confusion that might occur when travelling in in different time zones.

TIME ZONE OF INDIA



✗ To find the **time zone** in hours of a particular location, you can follow these steps:

- + Take the longitude (in degrees)
- + Divide it by 15.

✗ **Indian Standard Time** is calculated on the basis of $82^{\circ} 30' E$ longitude in the city of Mirzapur, Uttar Pradesh

Example 1 –

$$82^{\circ} 30' / 15 = 5.488 = 5.5$$

i.e. 5 and $1/2$ hours.

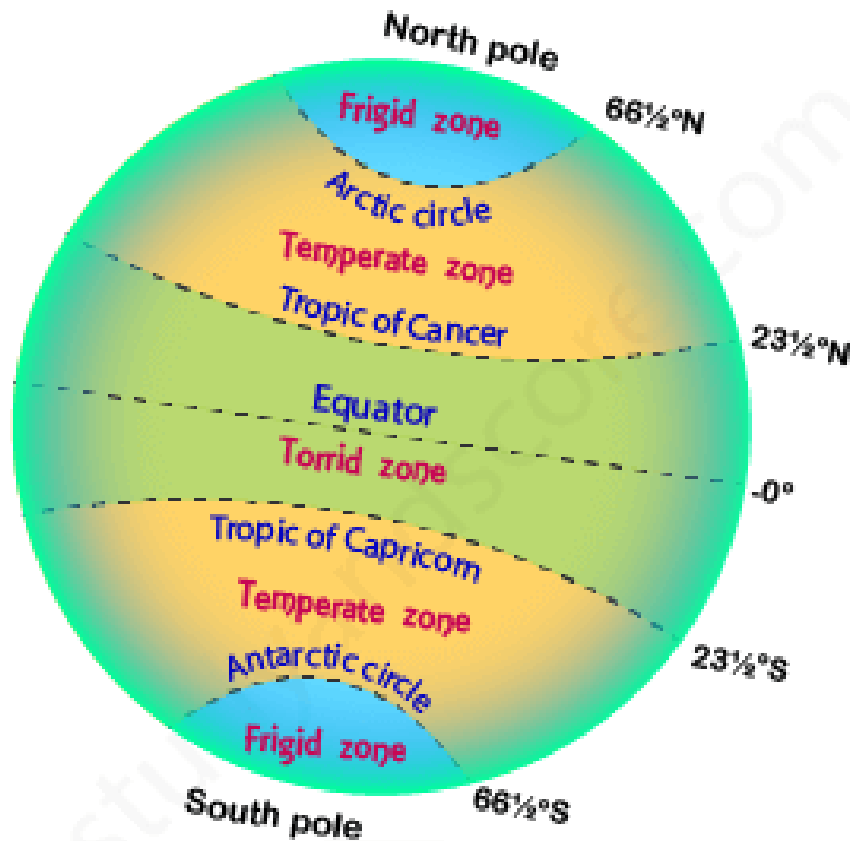
Example 2:

$75^{\circ} E$

✗ $= 75 / 15$ which equals 5.

The country on $75^{\circ} E$ longitude lies in the **time zone** which is 5 hours ahead of **GMT time**.

HEAT ZONES OF THE WORLD



LATITUDES & HEAT ZONES

On the basis of the heat received by the surface of the Earth, the world is divided into three main **heat zones**.

The Earth is divided into three Heat Zones.

1. The **Frigid Zone**-

This **zone** lies between 0° to $23\frac{1}{2}^{\circ}$ North and South to the equator. The Sun shines directly overhead at the places near the Equator and in the Tropics.

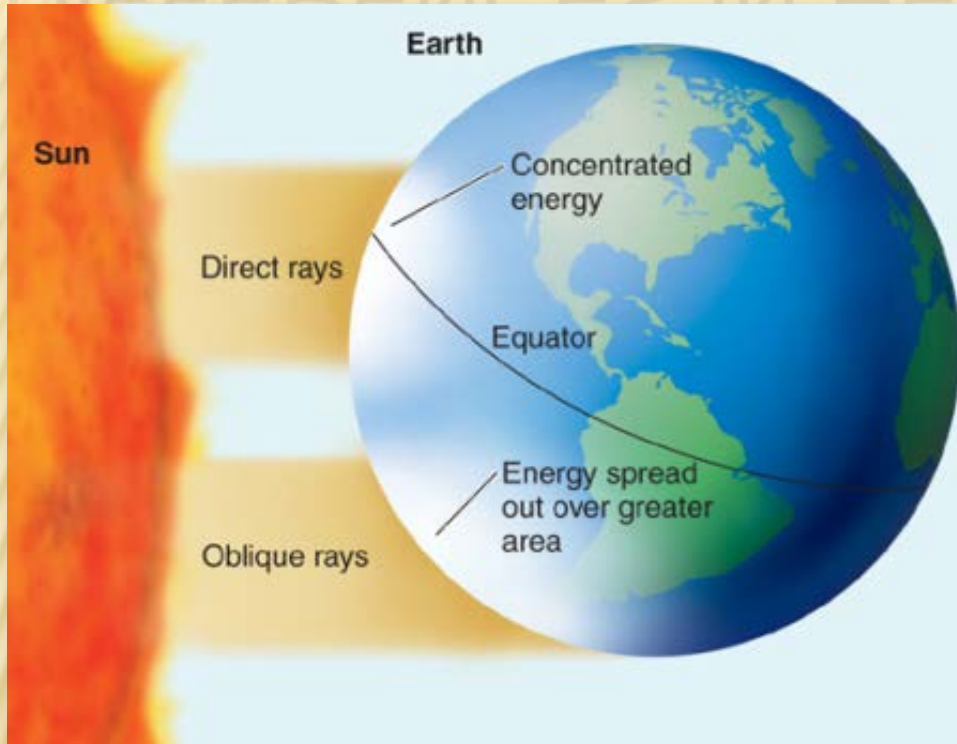
2. The **Temperate Zone**-

This zone lies between $23\frac{1}{2}^{\circ}$ to $66\frac{1}{2}^{\circ}$ North and South of the equator. The regions in the temperate zone experience the slanting rays of the Sun. Due to the spherical shape of the Earth, the amount of Sun's heat received by these regions is less.

3. The **Torrid Zone**-

This zone is located between $66\frac{1}{2}^{\circ}$ and 90° North and South of the equator. This zone experiences extremely slanting rays of the Sun over a large distance. Hence the amount of sun's heat received is very less.

DIFFERENCES IN HEAT ZONES



Torrid Zone

It is located between the Tropic of Cancer and the Tropic of Capricorn.

The zone receives maximum amount of heat from the Sun.

Frigid Zone

It is located to the north of the Arctic Circle and the south of the Antarctic Circle.

The zone receives minimum amount of heat from the Sun.

EXERCISE QUESTIONS

D. Distinguish between the following.

Q1. Parallels and Meridians

Ans.

Parallels	Meridians
1. These are imaginary lines drawn on maps and globes which are horizontal lines from East to West.	1. These lines are drawn on maps and globes so that people can locate places. Meridians are lines that run from the North Pole to the South Pole.
2. All these lines are parallel to each other.	2. Meridians are not parallel to each other. They converge or come together at the Poles.
3. The 0° Parallel is called Equator.	3. 0° Meridian is called Prime Meridian.
4. Parallels is the other name for lines of latitudes.	4. Meridians are another name for lines of longitude.

Q2. Local Time and Standard Time

Ans -

Local Time	Standard Time
1. The time determined according to the longitude of a place is the local time of that place.	1. The local time of the Standard Meridian of a time zone is called the Standard Time of the entire area.

E. Explain the following terms.

Ans 1. **Equator**: An imaginary line running midway between the North Pole and South Pole. This line is a circle and we call it **Equator**. The Equator is taken as the starting line and thus, marked as 0° latitude.

2. **Prime Meridian** : The Prime Meridian which passes through the Greenwich is the 0° longitude and is considered as the starting point for the meridians.

3. **Time zones** : Each time zone is a narrow belt running from North to South, with a West – East extent of 15° of longitude. A Meridian passing through the center of each time zone has been selected to give the Standard Time of that Time Zone.

G. Give short answers for the following questions.

Ans 1. **How is the axis of the earth useful in locating places on the globe?**

Ans. The axis of the earth helps in locating places in the North Pole, South Pole and the Equator . Thus, it is useful in locating places on the globe.

Q2. Compare the features of the torrid zone and temperate zone .

Ans.

Torrid zone	Temperate zone
1. This part of the earth experiences the direct rays of the sun. 2. This region receives maximum amount of heat.	1. This part of the Earth experiences slanting rays of the sun. 2. It receives less heat and has cold climate..

Q3. What are the advantages of having Parallels and Meridians?

Ans. The advantages of having Parallels and Meridians are that they can be used to define the location and the direction of any place on the globe or on the map.

Q4. Name any four countries which have more than one time zone.

Ans. The four countries which have more than one time zone are as follows:

1. Russia,
2. Canada,
3. USA
4. Australia.

QH. Long Answer Question:

Q1. What are the main characteristics of the meridians?

Ans. The main characteristics of the meridians are :-

1. The length of all the Meridians is the same as each one is a semi- circle.
2. Any two opposite Meridians, when taken together, form a complete circle, which is called a 'Great Circle'.
3. The maximum distance between any two meridians is at the equator, which is about 111 km for 1 ° of longitude.
4. All the meridians meet at the poles.

OTHER IMPORTANT TERMS

- ✗ **Lines-** (on the globe) refer to ‘parallels and meridians’. These are imaginary lines drawn on a globe for reference of particular points.
- ✗ **Distances-** (on the globe) refer to ‘latitudes and longitudes’.
- ✗ **Frigid-** it means ‘very cold’.
- ✗ **Temperate-** it means ‘moderate’
- ✗ **Torrid-** it means ‘intense heat’