Blue Marble Geographics

Applied Geodesy Training

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Geodesy

What is Geodesy?

- The science of measuring the size and shape of the Earth
- Includes the determination of the exact position of points on its surface

Coordinate System

- A reference system used to measure horizontal and/or vertical distances and angles on a map.
- Defined by:
  - Datum
  - Ellipsoid
  - Map Projection
  - Units
  - **Origin**

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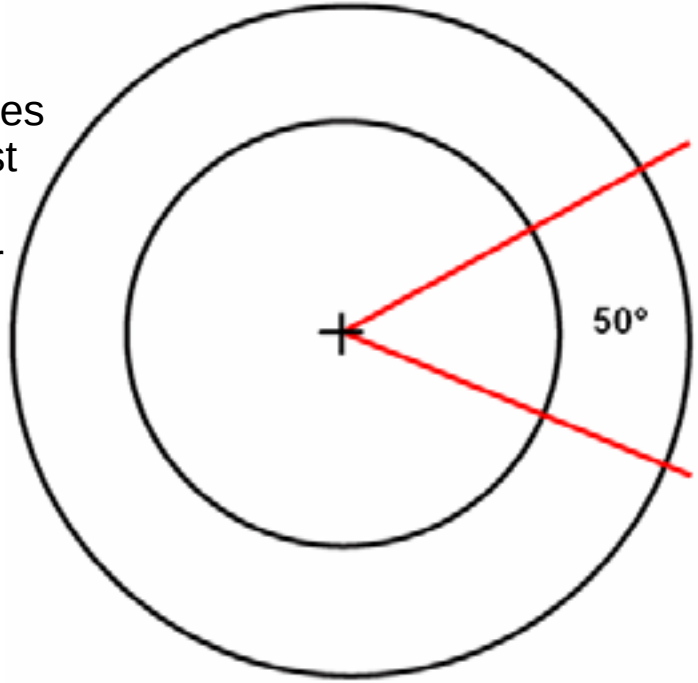
Coordinates

- What are Coordinates?
  - A set of numbers used to represent points in space
  - Relative to the **Origin**
  - Depending on the coordinate system, coordinates can be displayed in various formats of various units.

- Units
  - Angular
    - In Geodetic Coordinate Systems, coordinates are given in terms of angular units, the most common being Degrees.
    - Angular units can be displayed in a number of formats
  - Linear
    - Cartesian coordinate systems use linear references for the coordinates
    - Unit format is mostly limited to decimal precision.



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Geodetic Coordinate Systems

Geodetic Coordinate Systems

- The Earth is not round, but rather a lumpy pseudo-sphere. Despite this, globes are the most accurate map of Earth we have.

- All geodetic systems use Latitude and Longitude to define the position on the Earth. These are angular measurements; they are not linear.

- The two main reference lines from which all distances and locations are calculated are the Equator and the Prime Meridian.

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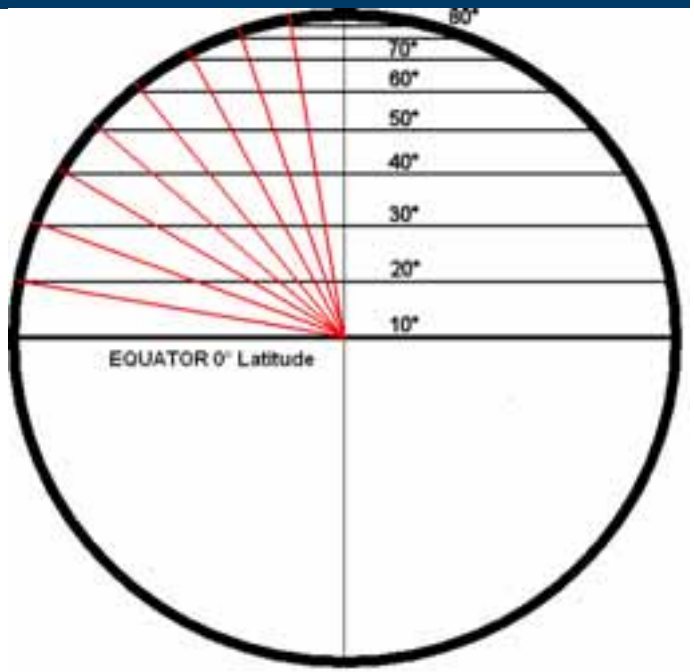
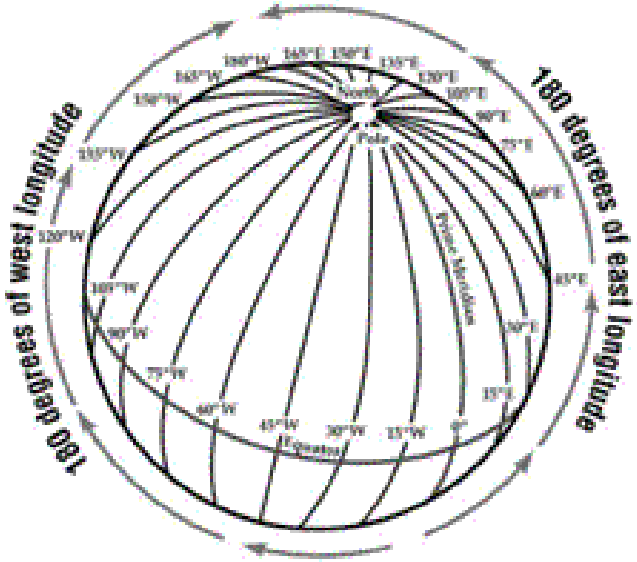
The Equator & Prime Meridian



The Equator

- The Equator divides the Earth in half with an imaginary line that runs East/West around the middle of the globe.
- All similar lines running parallel to the equator at constant increments are called lines of *Latitude.*
- Also referred to as parallels, they run 90 degrees north and 90 degrees south of the equator and they never intersect with each other.



The Prime Meridian

- The Prime Meridian is a mostly imaginary (and arbitrary) line that runs North/South, dividing the Earth in half from pole to pole. (Est. 1851 by Sir George Airy; standardized in 1884.)
- It runs through the Royal Observatory of Greenwich, England and is also known as the *Greenwich Meridian*.
- All similar lines running North/South through the poles at constant intervals are called lines of *Longitude.*
- They are farthest apart at the equator and converge at the poles.

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