Spherical trigonometry.

Polaris - North Star that doesn't appear to move - 1°

Elegant Proof

Basic Proof Earth is round.

@ North Pole - takes 24 hrs

How do you find your way around Planet?

Map Making

1. Grid
2. #
3. Elm St. located 3-C

N
5 lines parallel to equator

North

Only equator is great circle

Ant Great Circle East
Parallels
Meridians = think of direction of lines

Longitude = measurements
Latitude

37° Parallel
38° Parallel - Korean War
42° Parallel - Top of California, Nevada, Utah

Can't have a lat. > than 90°

Greenwich, England = 0°
Longitude lines

Lat = 37° N
Long = 122° W

360° ÷ 25,000 mile = 70.58/mile
Square miles = 149,200 miles

95°
Accuracy: # # # # #

GPS: 
- Boats
- Airplanes
- Cars
- Misc.

00° 00' 00" 00

Global positioning System [Satellites launched up into space]

2/3/00 notes:
Lat./Longitudes

- GPS - Global Positioning System
- Reason why use time: $[hr]\ min\ 'sec''\ hundreds\ of\ sec.$

[Greenwich England - is Prime Meridian] 0°:00'00" time/Distant from Greenwich England

\[ \approx 1\ min = 6,000\ ft. \quad 1\ sec. = 100\ ft. \]

- How big is a degree:
  - Equator about 70 miles
  - But changes as you get closer to pole
  - [The Distance changes]
    - From Equator to 70 miles
    - North Pole to 0 miles

- How Big is a degree: doesn't change much.
  - Around 27 miles
  - Only because of rotation and distortion of Earth.

- How Far is a mile?
  - [2-types]
    - Statute miles [found in car - odometer]
      \[ \frac{\text{mi}}{\text{ft}} = \frac{5280}{1000} \text{ Feet} \quad \text{derived Roman Paces} \]
INTERNATIONAL - NAUTICAL MILE (6076.1 feet)

\[ f: \text{1 min LATITUDE @ 45° in either direction} \]

(Because of polar flattening - the distance changes >
Thus only \(1°00'\) Latt. @ 45° = is \(6076.1\) feet)

\[
\text{INTERNATIONAL NAUTICAL MILE / or STATUTE MILE}
\]

\[ 6076.1 \, \text{ft} \cdot \left(\frac{5280}{1}\right) = 5280.0 \, \text{ft} \]

What's a Cubit?

Distant from

Elbow to tip of finger

CADAstral SYSTEM: system of determining ownership of land and boundaries

(Latin-based term)

Everyone worked their way up and down - individuals owning land

IDEA

SYSTEM from METES & BOUNDs = (system) [odd shape properties]

Roads become boundaries/markers

Consider natural land marks i.e., tree → to creek → to pink rock → to small stone rocks

Back to road → would mark out the boundaries of land

Both Spanish and Mexican time frames;
where found on Metes and Bound systems

SYSTEM = found in 1785 Thomas Jefferson

RECTANGULAR SYSTEM

- Idea to give everyone enough land to be self-sufficient
3. [Meads Ranch/Kansas] - TODAY Big Brass Ball where all these
Meridian lines that pass thru both poles N and S.

Armies job was to start in center and walk 6 miles out in both directions.

Mr. Homestead Act - Army Survey Land - Next set time place = think for 5 years

Gov't decided to give land away in these sections. Now people had to live or land for 5 years.

Thus we like in Mt. Diablo principle Meridians.
[In California there are 3 principle Meridians]

This was so big and way more land than anyone needed, thus army divided it into 36 equal parts [the # intersects @ Top Pt. corner]

The deed would read for this square

[TEAR 3 SOUTH RANGE 3 WEST]

[Meridians come together @ the poles]

1 sq mile = 640 acres
**Bed system**

or **TRACT**

**SUB-DIVISION** - **Big** House on Small lots. (Now a Days)

1. Go to County - Surveyor comes out and divided up land.
2. Next you number the sections and give record to County Clerk.

MAPS & Surveys are important in many areas.

1890 - Yosemite National Park is established. After people owned parcels of land, 
→ "In Holdings" → were the deeds/title of property markers.

**MAPS & MAP PROJECTIONS**

5: Cartography - Map Maker

1. When does Drawing Become a Map? What do you need.

**5 Things** - Maps must have

1. Projection
2. Orientation/direction
3. Scale
4. Legend/key
5. Title

**Title**: Needs to be [Short/To the point]

Relief = means elevation differences
Need to put title of what it is that they're looking at.

Political map - Shows state lines
Physical (etc.)

**Scale**: Relationship between distances in size from map to real world.

**RF** = Representative Fraction. Ex: 1 mile = 50,000 miles

"Rule of 250" - Basically everyone knows about 250 people - Because
Review [5 things maps must have]

1. Projection
2. Orientation/direction
3. Scale
4. Legend/key
5. Title

Representative Fraction - Ratio

1 unit of measure = _______ units of measure

Scale:

Graphical Scale

Bar Scale: is most useful for road maps.

Verbal Scale:

Everything is all written out for you. - i.e.: Basic California Map.

Direction:

There are (3) types of North:

1. True North
2. Magnetic North
3. Grid North

Compass came from invention from the East.

This compass points North and now maps are turned to where North is up.

Cardinal Direction of Compass:

N = North  W = West  S = South  E = East
COMPASS POINTS: General NORTH and to the MAGNETIC NORTH close to Hudson Bay.

LAT: 70°N LONG: 100°W
LAT: 90°N LONG: 0°W

MAGNETIC BEREINGS
TRUE BEREINGS

\[ \frac{1°}{70 \text{ miles}} \Rightarrow 20° (70 \text{ miles}) = 1400 \text{ miles} \]

Why have TRUE NORTH? \[ \Rightarrow \] [Building House]

Type 3: Use GRID - Grid Related to True North

- Military
- Archaeologist use grid
- Universal Transmit Location

- Short-hand for mapmaker
  \[ \text{e.g., } \rightarrow \] Rail Road
  \[ \text{ } \rightarrow \] Air port
  \[ \text{ } \rightarrow \] Camp ground (etc.)

- Simplify map
- Pictograph map \[ \Rightarrow \] Areal map tinted green - w/over lay
There are (4) different types of maps:

1. Colors represent different things (i.e. shapes and outlines of things, e.g. climate)
2. Patterns and arrangement (i.e. shows you sewers, gas lines, prices, etc.)
3. Distribution of numeric values (i.e., population map)
4. Elevation maps or surface relief

As a map reader, it's your responsibility to know the key/legend.

- **Map Projections**
  - All maps have distortions

  [Shape & Area] → You can have one or the other

  - A map that shows true shape is **false**: Conformal Map
  - A map that shows true area is **false**: Equivalent Map

- Don't speed on toll roads.