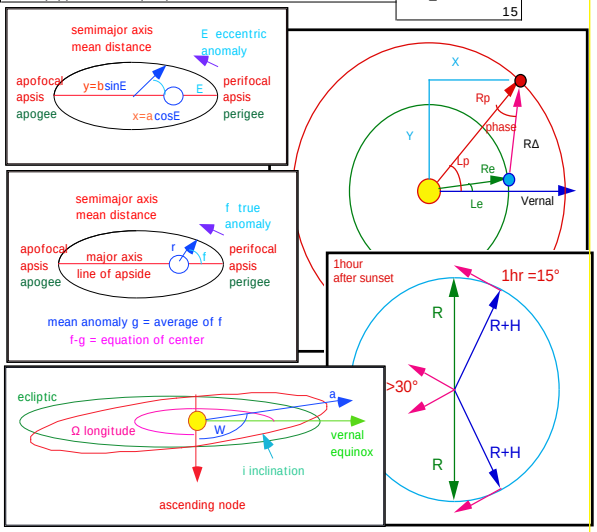
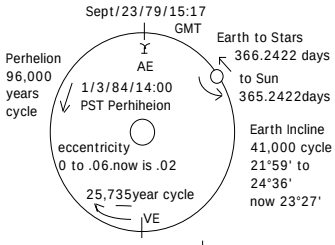
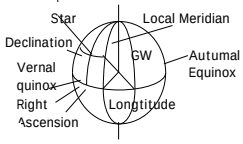
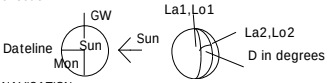
P_period_sec =2*PI()*a^1.5/sqr(k^2*μ)	k constant of grav
g =g0 +n*(t-t0) = μd*(t-T)=mean daily*(time since per)	k^2_cm^3/gsec^2
g0 and t0 at some epoc	6.6623E-08
e=eccentric=sqrt(1-(b^2/a^2))	μ_sum_mass
Kepler 3d law	1.99E+30
n^2*a^3=k^2*μ	M_sun_kgm
Kepler equation	1.9910E+30
g=E-e*sin(E)	m_earth_kgm
find true anomaly f ...and radius r	5.9790E+24
r*cos(f)=a*(cos(E)-e)	a_earth_km
r*sin(f)= a*sqrt(1-e^2)*sin(E)	1.4957E+08
where g*a^1.5 = k = 3548.31second	P_period_sec =2*
a in astromical units	31557088.1
find heliocentric coordinates	P_period_days =
w=distance from acsending node to perhelion	365.2440752
Ω=longitude of ascending node	Day_° =
μd = mean daily motiion	0.985642272
e= eccentricity	Day_""
i=incline to ecipse	3548.312178
y=r*(sin(Ω)*cos(f+w)+cos(Ω)*sin(f+w)cos(i))	n_radians
x=r*(cos(Ω)*cos(f+w)-sin(Ω)*sin(f+w)cos(i))	mean motion
z=r*sin(f+w)*sin(i)	a_semimajor
find geocnetric coordinates	axis
Re=radiuus earth	2*PI()_rad
Le=long earth	360
Ae=atlitude earth	24hr_°
RΔ=radiuus earthto planet	360
Lp=long planet	1hr_°
Ap=atlitude planet	15
RΔ*cos(Ap)*cos(Lp)=x +Re*cos(-Ae)*cos(-Le)	1min_'
RΔ*cos(Ap)*sin(Lp)=y +Re*cos(-Ae)*sin(-Le)	15
RΔ*sin(Ap)=z +Re*sin(-Ae)	1sec_"
	15



EARTH
1 TROPICAL YEAR 1900
31 556 926.9747 SEC
Decreases .53 secs per year
Days increase 1 millisec per century
due to tidal friction
±5 millisec 5 to 10 year cycle
due to internal of earth
Earth late 30msec in June
Earth ahead 30 msec in Oct
North Pole remains in a 40ft radius
around postion of pole
Magnetic Pole 1970
north 76.2N 101W
south 66S 139.1E
Precession of 23.5° due to moon
cause Vernal Equinox to move 50''
of an arc per year,25735 year
cycle move northpole in cclockwise
direction







NAVIGATION
CosD=SinLa1SinLa2+CosLa1CosLa2Cos(Lo1-Lo2)
ECLIPSE
x^2/a^2+y^2/b^2=1
Foci=ae
e={(a^2-b^2)/a}^1/2

F=ma=Gmm'/R^2
G=6.670E-11Nm^2/Kgm^2
accleration in circle=v^2/R
Energy=1/2mv^2
Impulse=∫fdt
momemtum=mv

	LONGTITUDE ASCENDING NODE DEG	RADIUS Km	EQUATION OF TIME due to ecliptic orbit MASSdiff between noon and Kgmexpected noon Jan 1,2m,21s slow
SUN ☉		695950	1.99E+30Feb 1,13m,26s slow
MERC ☿	47.667	2433	3.18E+23March1,12m,3s slow
VEN ♀	76.183	6053	4.88E+24April1,4m,8s slow
EARTH ⊕		6371.315 AV	5.98E+24May1,2m,53s fast
MOON ☾		1738.3	7.35E+22July1,3.31s slow
MARS ♂	49.133	3380	6.42E+23Aug1,6m14s slow
JUP ♃	99.883	69758	1.90E+30Sept 1,0m11s slow
SAT ♄	113.167	58219	5.68E+26Oct1,10m 5s fast
URAN ♅	73.717	23470	8.68E+25Nov 16m19s fast
NEP ♆	131.167	22716	1.03E+26Dec 1,11m9s fast
PLUTO ♇	131.278	5700	1.08E+24
HALLEY	58		

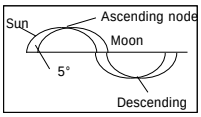
SOLAR DAY

JAN	24H 0M 29S
APRIL	23H 59M 42S
JULY	24H 0M 12S
OCT	23H 59M 41S

UT=24 HOUR GMT
PST =UT-8 Pacific Std
EST=UT-5 Eastern
MST=UT-7 Mountain
CST=UT-6 Central
PDT=UT-7 Pacific Daylit
(April 24 to Oct 29)

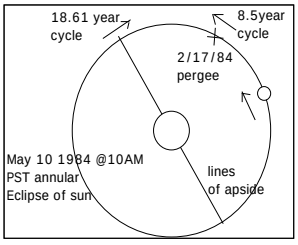
	REVOLUTION Solar Sec	EQUATOR TO ORBIT DEGREES	ORBIT TO ECLIPTIC DEG		ECCENT	LONTITUDE PERHELION DEG (a-x)	PERHELION
SUN ☉							
MERC ☿							
VEN ♀	7.60E+06	0	7.0028	5.80E+07	0.2056	76.583	4.60E+07
EARTH ⊕	1.94E+07	R179.0	3.4	1.08E+08	0.0068	130.783	
MOON ☾	3.16E+07	23.45	0	1.50E+08	0.0167	101.983	1.47E+08
MARS ♂	2.36E+09	6.683	5.12	3.84E+05	0.0549		3.63E+05
JUP ♃	5.94E+07	25.2	1.85	2.28E+08	0.0934	335.033	
SAT ♄	3.74E+08	3.117	1.309	7.78E+08	0.0484	13.417	
URAN ♅	9.30E+08	26.75	2.493	1.43E+09	0.0543	91.95	
NEP ♆	2.65E+09	R97.983	0.0773	2.87E+09	0.046	169.75	
PLUTO ♇	5.20E+09	29	1.779	4.50E+09	0.008	44.117	
HALLEY	7.84E+09	29?	17.146	5.91E+09	0.2481	270.059	4.4439
			162			306?	8.82E+06

MOON
SIDREAL PERIOD 27days 7hours 43.2minutes
New Moon 29days 12hours 44.05minutes
INCLINE OF ORBIT 5°8'
5°18' to 4°59' due to external
Regression of Nodes 18.6 years
Advance of perogee 8.85 years



TIDES
NEW OR FULL MOON=SUN + MOON =SPRING TIDES
QUARTER MOON TIDES CANCEL OUT= HEAP TIDES

ECLIPES
Eclipse year=346.6 days
reccurent eclipse=saros
223 synalic months=18 years 11+1/3 days
Feb 26 1975 Eclipse
Begin 16h 9.2m GMT
Aparent noon 17h 21.4m
End 17h 39.0
Max duration 2m 49s
Portland Oregon Lat(45°31'06'')Lo(122°40'35'')
San Jose Lat(37°20'16'')Lo(121°53'24'')



SEASON & CLOCK DATES
Spring Equinox
(Spring begins & day and night equal length) March 20
Daylight saving time starts.
move 1 hr ahead. 2a.m. on first Sunday in April
Summer Solistice
(summar begin & sun is farthest north of the equator June 20
Autumn Equinox
(Fall begins & day and night equal length) September22
Daylight saving time End,
move 1 hr back 2 a.m. on last Sunday in October
mnt Solistice
(winter begin & sun is farthest south of the equator December 21

SIGNS of THE ZODIAC

Name	Symbol	Dates	
Aries	Ram	March 21-April 19	1900 88°46'
Taurus	Bull	April 20-May 20	1910 88°50'
Gemini	Twins	May 21-June 20	1920 88°53'
Cancer	Crab	June 21-July 22	1930 88°56'
Leo	Lion	July 23-Aug 22	1940 88°59'
Virgo	Virgin	Aug 23-Sept 22	1950 89°02'
Libra	Balance	Sept 23-Oct 22	1970 89°05'
Scorpio	Scropion	0ct 23-Nov 21	1980 89°08'
Sagittarius	Archer	Nov 22-Dec 21	1990 89°11'
Capricorn	Goat	Dec 22- Jan 19	2000 89°14'
Aquaruis	WaterBearer	Jan 20-Feb 18	2010 89°20'
Pisces	Fish	Feb 19- March 20	

POLARIS MUST BE OBSERVE 12 HOURS APART TO SET POLE
DECLINATION OF POLARIS