1.1

Synodic period (S)

siderial period (P)

$$\frac{1}{S} = \begin{cases} \frac{1}{P} - \frac{1}{P_\oplus} & \text{(inferior)} \\ \frac{1}{P_\oplus} - \frac{1}{P} & \text{(superior)} \end{cases}$$

~~शिक्षा~~

i) Inferior.

$$P < P_\oplus \quad , \quad \frac{2\pi}{P} > \frac{2\pi}{P_\oplus}$$

$$\frac{2\pi}{P} - \frac{2\pi}{P_\oplus} = \frac{2\pi}{S}$$

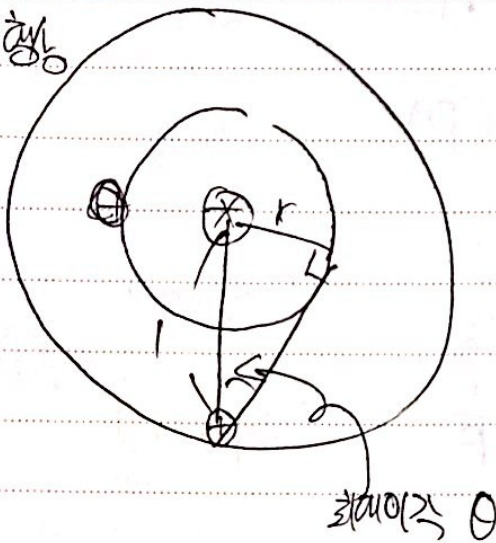ii) Superior $P > P_\oplus$ $,\quad \frac{2\pi}{P} < \frac{2\pi}{P_\oplus}$

$$\frac{2\pi}{P_\oplus} - \frac{2\pi}{P} = \frac{2\pi}{S}$$

$$\therefore \frac{1}{S} = \begin{cases} \frac{1}{P} - \frac{1}{P_\oplus} & \text{(Inferior)} \\ \frac{1}{P_\oplus} - \frac{1}{P} & \text{(Superior)} \end{cases}$$
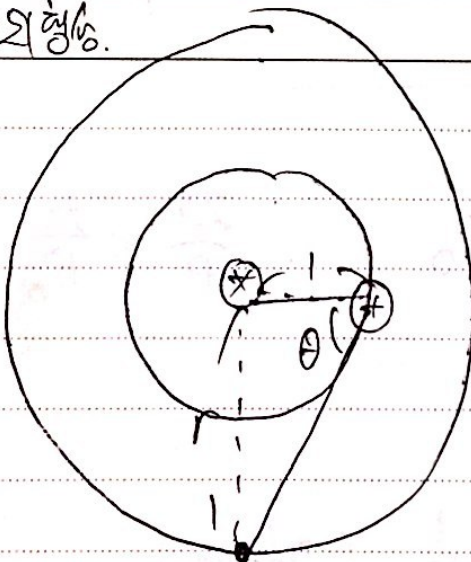
1.2.

i) 내행성

최대이각 θ

$$r = \sin\theta$$

ii) 외행성.

회합주기의 $\frac{1}{4}$화는 시점에서,

외행성의 역행을 측정

$$\therefore r = \tan\theta.$$

1.3

i) Venus $\dfrac{1}{S} = \dfrac{1}{P} - \dfrac{1}{P_\oplus}$, $\dfrac{1}{583.9} = \dfrac{1}{P} - \dfrac{1}{365.26}$

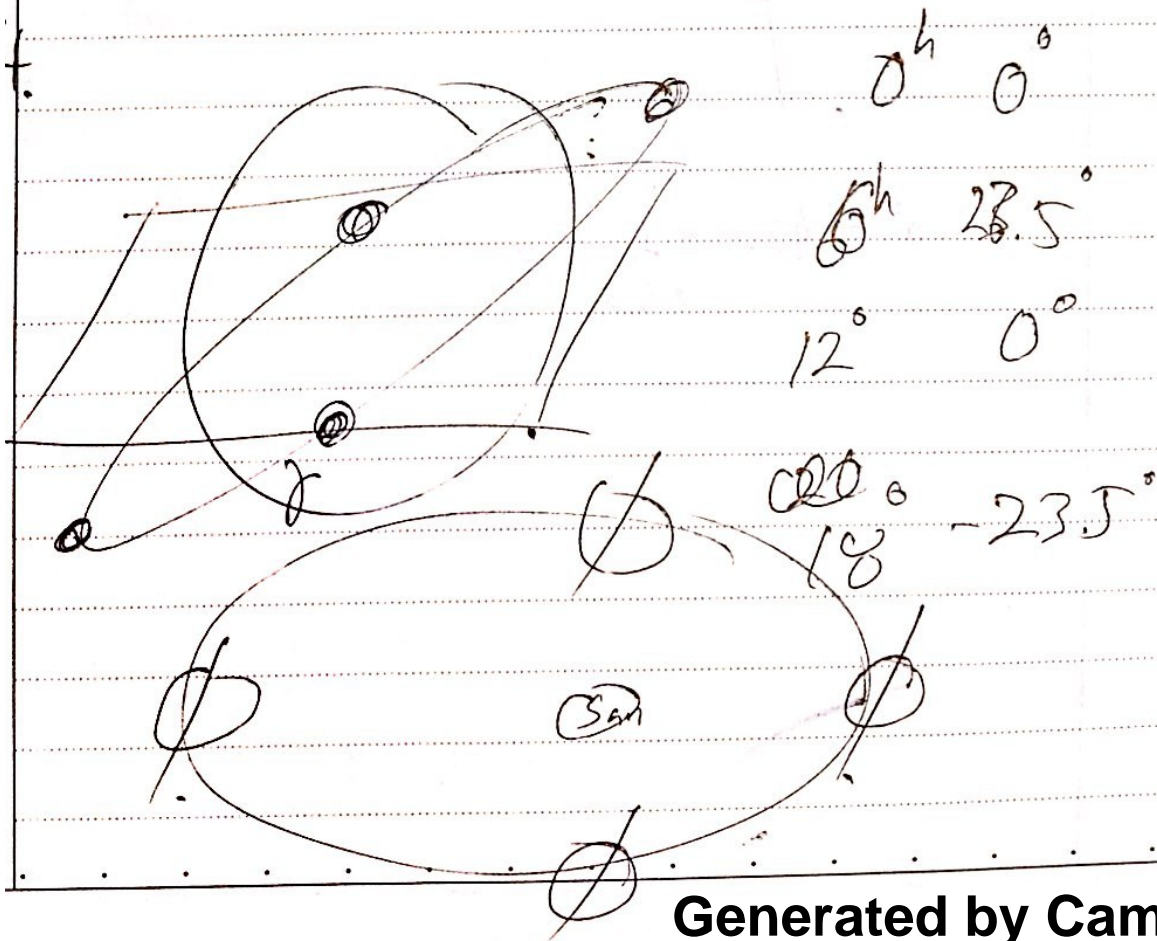ii) Mars $\dfrac{1}{S} = \dfrac{1}{P_\oplus} - \dfrac{1}{P}$, $\dfrac{1}{779.9} = \dfrac{1}{365.26} - \dfrac{1}{P}$

$= \dfrac{1}{\frac{1}{583.9} + \frac{1}{365.26}} = 224.70$ ii) $P = \dfrac{1}{\frac{1}{365.26} - \frac{1}{779.9}} = 687.02$
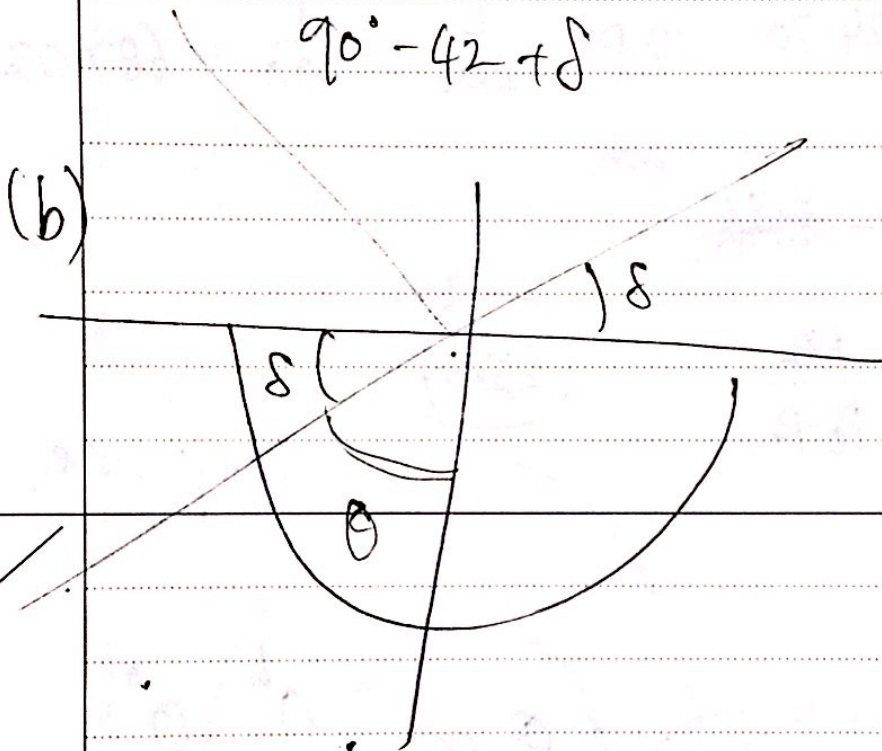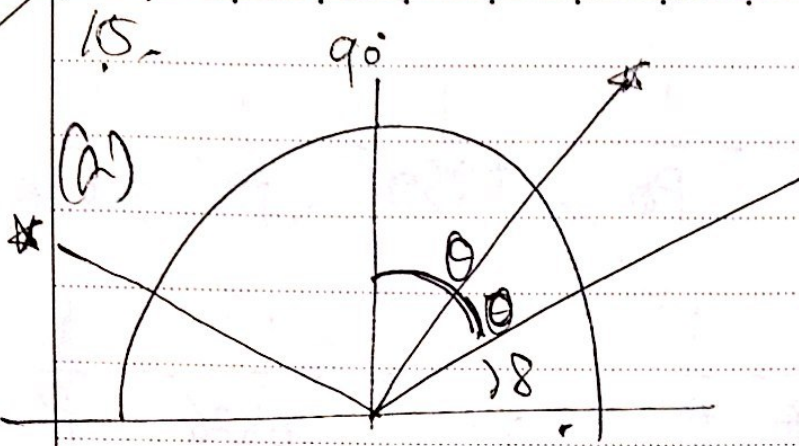
~~Mercury~~

$S = \dfrac{1}{\frac{1}{P} - \frac{1}{P_\oplus}} = \dfrac{P P_\oplus}{P_\oplus - P_\oplus}$ (6.5 h)

Neptune

0^h 0°

6^h 23.5°

12° 0°

18° -23.5°

(Sun)

15.

(a)

$90°$

θ

θ
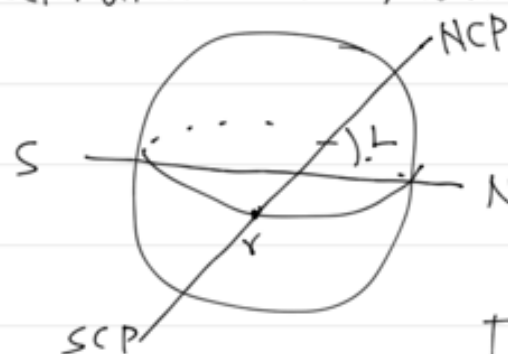
δ

$90° - 42 + \delta$
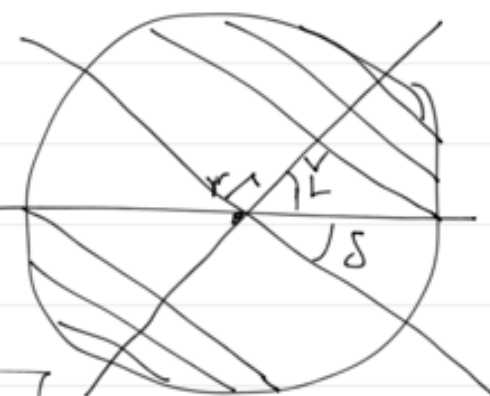
(b)

δ

δ

θ

$90° - 42 - \delta =$
25.5

1.6

(a) Circumpolar star : 주극성

declination : 적위 , latitude : 위도

$$90° - L \leq \delta \leq 90°$$

$$-90° \leq \delta \leq -90° + L$$

(b) Sun's declination : 23.5°
(at Summer solstice)

$$90° - 23.5° = 66.5° = L$$

(c) Vernal equinox : 춘분점.

declination at vernal equinox of the Sun : 0°

yes! each pole is .

1.7

Julian date for 16:15 UT on July 4, 2006.

$$JD = 2451545.0 + (365.25 \times 5) + (365.25/2) + 4 + 0.18$$

2000 (yr)   5 (yr)   6 (Mn)   4 (day)

$$\frac{6}{\frac{1}{4}} = \frac{4\frac{1}{4}}{?} , \ ? = \frac{\frac{17}{4} \times \frac{1}{4}}{6} = \frac{\frac{17}{4}}{6} = \frac{17}{96} = 0.18 \qquad \therefore JD = 2453558.06$$

(b)

$MJD = JD - 2400000.5 = 53557.56$

$\therefore JD = 2453558.06$

1.8

1.8

$$(\Delta\theta)^2 = (\Delta\alpha\cos\delta)^2 + (\Delta\delta)^2$$

α Cen C $(\alpha,\delta) = (14^h 29^m 42.95^s, -62°40'46.1'')$

$$\left(14^h + 29^m \frac{1^h}{60^m} + 42.95^s \cdot \frac{1^m}{60^s} \cdot \frac{1^h}{60^m} = 14.50^h \times \frac{15°}{1^h} = 217.5°\right)$$

$$\left(-62° - 40' \frac{1°}{60'} - 46.1'' \cdot \frac{1'}{60''} \cdot \frac{1°}{60'} = -62.68\right)$$

α Cen A $(\alpha,\delta) = (14^h 39^m 36.50^s, -60°50'02.3'')$

$$\left(14^h + 39^m \cdot \frac{1^h}{60^m} + 36.50^s \cdot \frac{1^m}{60^s} \cdot \frac{1^h}{60^m} = 14.67^h \cdot \frac{15°}{1^h} = 220.05°\right)$$
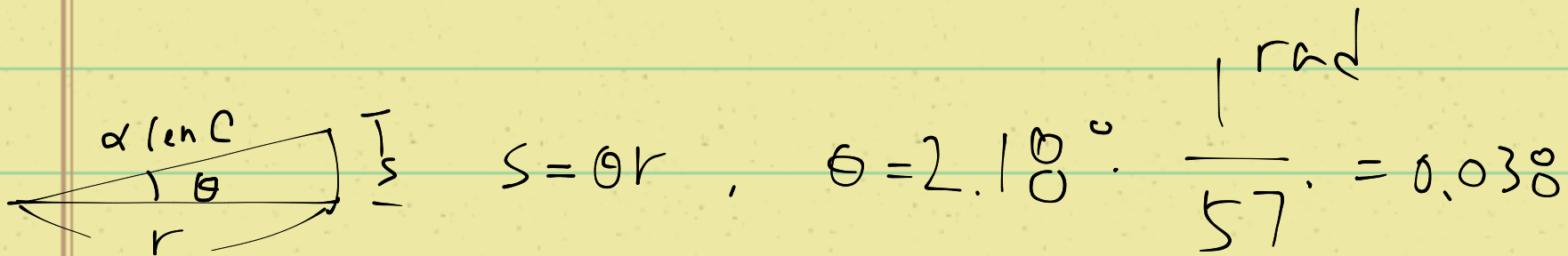
$$\left(-60° - 50' \cdot \frac{1°}{60'} - 02.3'' \cdot \frac{1'}{60''} \cdot \frac{1°}{60'} = -60.84°\right)$$

$\therefore \alpha$ Cen C $= (217.5°, -62.68°)$, α Cen A $= (220.05°, -60.84°)$

$$\Delta\alpha = -2.55°, \quad \Delta\delta = -1.84°, \quad \delta = -62.68°$$

$$\therefore (\Delta\theta)^2 = 4.76°, \quad \Delta\theta = 2.18°$$

1.8 (b)

$S = \theta r$, $\theta = 2.18° \cdot \dfrac{1 \, rad}{57°} = 0.038$

$S = \theta r = (0.038) \cdot (1.0 \times 10^{16} m) = 1.52 \times 10^{15} m$

1.9 (a)

$\Delta \alpha = M + N \sin \alpha \tan \delta$

$\Delta \delta = N \cos \alpha$

J2010.0 . $T = 0.1$, $M = 0.1281236°$, $N = 0.5567518$

$\therefore \alpha \, Cen \, C = (217.4284583, \, -62.67947222)$

$\Delta \alpha = 0.784225°$

$\Delta \delta = -0.441701$

$\therefore$ 최종 값 $(\alpha, \delta) = (217.9131833°, \, -63.12117322°)$,

$\quad = (14^h 31^m 39.16^s, \, -63°07'16.22'')$

1.9 (b)

$\Delta \alpha = (3.84'' yr^{-1}) \cdot \dfrac{\sin \phi}{\cos \delta}$, $\Delta \delta = (3.84'' yr^{-1}) \cdot \cos \phi$

$3.84'' \cdot \dfrac{1'}{60''} \cdot \dfrac{1°}{60'} \, yr^{-1} \cdot 10 yr = \dfrac{4}{375}°$ 이동 (10년간)

$\phi = 282°$

$\Delta \alpha = -0.0236778$, $\Delta \delta = 2.2177217 \times 10^{-3}$

(c) precession.

때문.

1. 10

1. 11