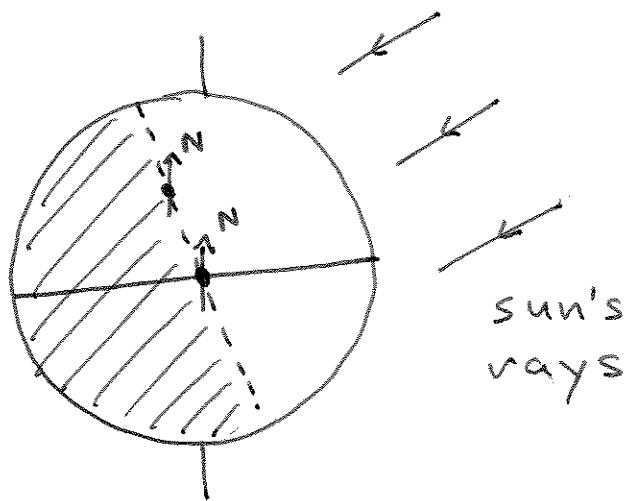


Sample Midterm 1

①

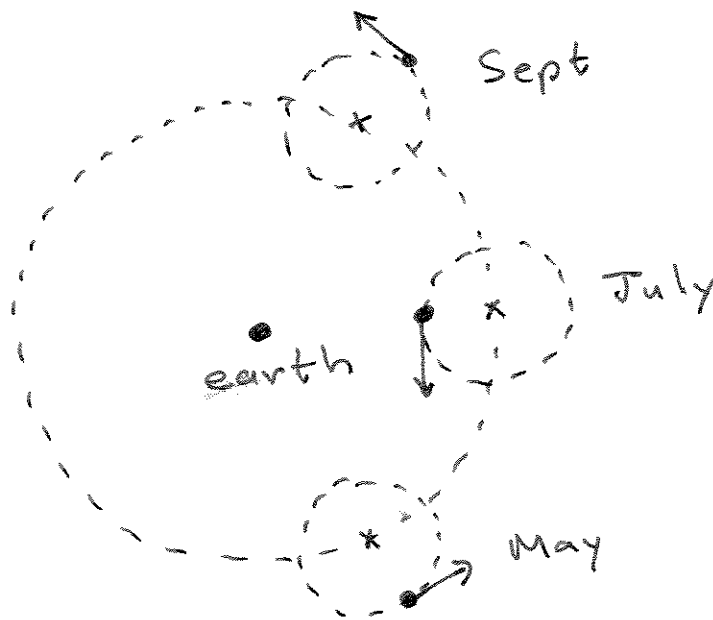


⇒ all observers see sunrise 12° north of east

② Retrograde motion: planets sometimes reverse their direction of travel relative to the stars.

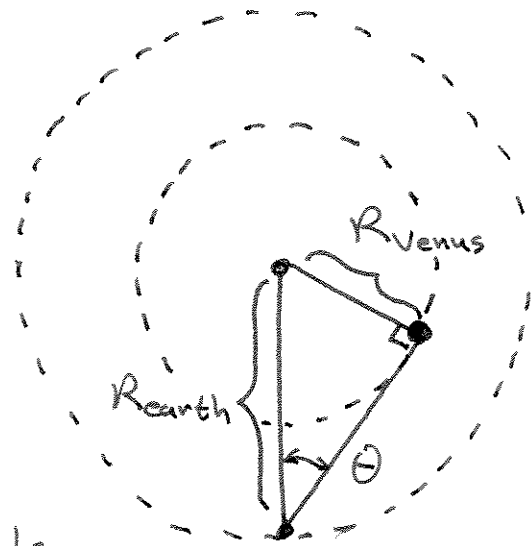
Explained by epicycle: planet moves on circle that orbits earth

example:



③ Observe Venus when it has maximum apparent distance from the sun:

⇒ $\theta = \text{measured}$



⇒ right triangle

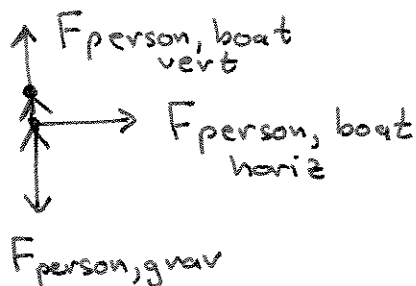
can be solved for $R_{\text{Venus}} / R_{\text{Earth}}$

④ The very precise observations of Tycho Brahe could not be fit by Copernicus' epicycles.

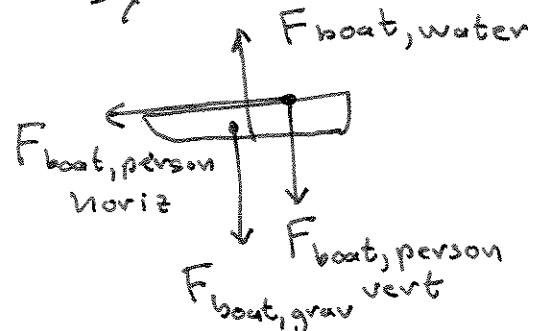
⑤ $v_i = 0 \Rightarrow \Delta y = -\frac{1}{2} g \Delta t^2$ (const accel)

$$g = -\frac{2\Delta y}{\Delta t^2} = 6 \text{ m/s}^2$$

⑥ sys = person



sys = boat



→ direction person is moving

Notation: $F_{A,B}$ = force on A due to B

$$N3 \Rightarrow F_{\text{person, boat}}^{\text{vert}} = F_{\text{boat, person}}^{\text{vert}}$$

$$F_{\text{person, boat}}^{\text{horiz}} = F_{\text{boat, person}}^{\text{vert}}$$