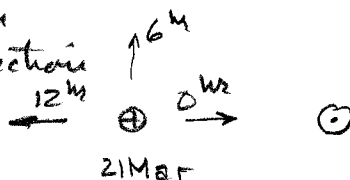


1. a) The three "stars" are moons orbiting Jupiter.
 b) The motion of the planets is complicated. Ptolemy's model explains them in a complicated way.

c) Step 1: Draw model of moon

Step 2: Figure out the direction of \odot 's.

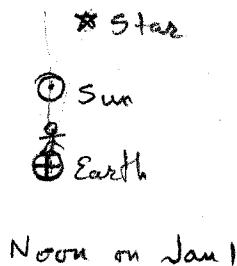
The full moon is at 0^{hr} .
 The 3rd quarter moon is at 6^{hr} .



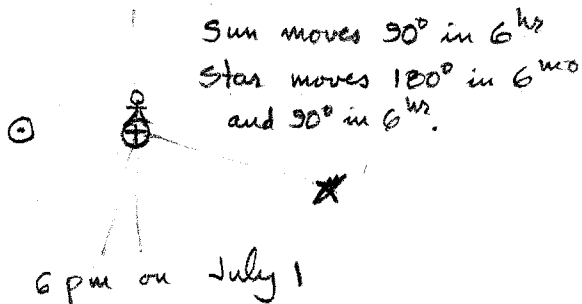
\circ Moon now

\oplus \circ Moon a week ago approximately
 Full equinox

2.



Noon on Jan 1



Sun moves 90° in 6^{hr}
 Star moves 180° in 6^{mo}
 and 90° in 6^{hr} .

6 pm on July 1

3. a) For ^{stars of} the same mass, the smaller the period, the smaller the orbit. Since the new planet's period, 0.01 yr , is smaller than Mercury's, its orbit is smaller.

b) $P^2 = R^3$ $R^3 = (0.01)^2$

c) $R = 0.046 \text{ AU}$

4. "The Earth is slightly closer to the sun during the winter in the northern hemisphere. As a result, the Earth moves faster along its orbit in the winter (in N.H.) The rotation of the Earth, however remains a constant. When the Earth is moving around the sun in June, it moves slowly, and the point at which the sun is on the meridian is not affected much by Earth's orbit. However, in December, the Earth moves around the sun faster, and the Earth must rotate more in order for the Sun to be on the meridian" on the next day

- Chad McAlvey