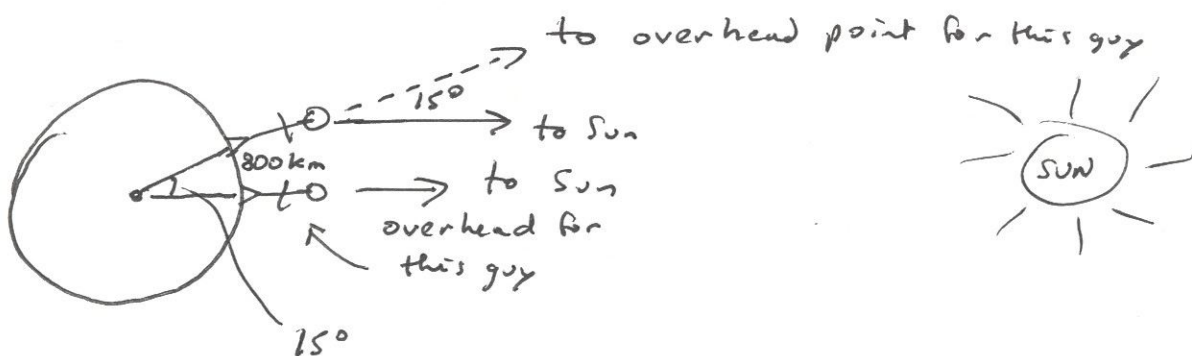


4. (14 points) Imagine that you live in a city on a planet where on the summer solstice the Sun is 15 degrees from the zenith at noon. On the same day, at noon, the Sun passes directly overhead at a city 800 km south of your city. What is the circumference of the planet?

$$\frac{15^\circ}{360^\circ} = \frac{800 \text{ km}}{\text{circumference}}$$

$$\text{circumference} = 19,200 \text{ km}$$



5. (14 points) What conditions are necessary for a total solar eclipse to occur?

- 1) The moon must have a phase of "new".
- 2) The line of nodes of the Moon's orbit must be pointing towards the Sun.