Quiz   **Name**

1. Copernicus spent many hours at dusk on cloudless days looking at the sky from his vantage point E in the city of Torun in Poland. Each time, the Sun S had just descended below the horizon and the planet Mercury M was visible as a faint point of light. He could measure the angle $\angle MES$ and he did so again and again at different times of the year. The largest value that he obtained for this angle was $23°$. What could he deduce from this measurement about the distance SM?

   i. Draw a "birds-eye" view of the triangle $\triangle MES$ along with a part of the orbit of Mercury at the moment Copernicus made the measurement of $23°$.

   ii. Discuss what Copernicus could conclude about the distance SM?

2. In the figure below O and P are fixed points that are a distance d apart. The point E_1 lies on a circle with center O. The angles α_1 and β_1 are determined by the position of E_1. What condition must the angles α_2 and β_2 satisfy so that E_2 lies on the same circle. (The answer is the essence of Kepler's correction of Copernicus's study of Earth's orbit.)