2. COMET (8 points) — *Jaan Kalda.* A comet's orbit intersects the Earth's orbit (which can be assumed to be circular of radius $R_0 = 1.5 \times 10^8$ km) at an angle $\alpha = 45°$. The comet's and the Earth's orbits lie on the same plane.

i) *(3 points)* Find the distance $R_{\min}$ of the comet's perihelion P from the Sun (i.e. its shortest distance). The distance $R_{\max}$ of the comet's aphelion A from the Sun (i.e. its longest distance) can be assumed to be much larger than R_0.

ii) *(5 points)* For how many days t will the comet's distance to the Sun be less that R_0?