

**Exercise 2.2:**

A simple two-dimensional solar system model with one sun and one planet should be animated. The centre of the sun is located in the origin of the coordinate system. The spherical planet with a radius of 10 units rotates anticlockwise around the sun on a circular orbit with constant speed. The radius of the planet's orbit (the distance between the centres of the sun and the planet) is 200 units. In the beginning of the animation the centre of the planet is located at the point  $(200, 0)$ . During one rotation around the sun, the planet rotates 365 times anticlockwise around its own axes. Consider the point on the planet that is closest to the sun in the beginning of the animation. Use geometric transformations to describe where the point will be located after the planet has finished one third of its orbit.

**Solution:**

$$R\left(\frac{2\pi}{3}\right) \cdot T(200, 0) \cdot R\left(\frac{4\pi}{3}\right) \cdot T(-200, 0) \cdot \begin{pmatrix} 190 \\ 0 \end{pmatrix}$$