Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. A moving particle moves on the circle with center $(-3, -7)$ and radius 2, starting at time $t = 0$ from the westernmost point and moving counterclockwise until it reaches the south. Find parametric equations describing the motion of this particle.

2. Consider the parametric equations:

$$\begin{cases} x & = & \frac{1}{2}t^2 - 77 \\ y & = & \frac{1}{3}t^3 - 3t^2 + 14t + 77 \end{cases}$$

Find the values of the parameter t for which the tangent lines to the the point(s) of the given parametric curve are parallel to the parametric straight line $\begin{cases} x = s + 7 \\ y = 3s - 7 \end{cases}$.