Math 1221: Recitation 11 (R)

Naufil Sakran

(1) Solve the following. **(Do any two of them)**

    (a) Find the equation in the xy-plane whose graph includes $x = 8\sin t$ and $y = 8\cos t$.

    (b) Find the equation in the xy-plane whose graph includes $x = t^7$ and $y = 7\ln t$. Also, state the domain of the rectangular form.

    (c) Find the equation in the xy-plane whose graph includes $x = \ln 8t$ and $y = t^2$.

(2) Solve the following questions. **(Do any two of them)**.

    (a) Determine the slope of the tangent line, then find the equation of the tangent line at the given value of the parameter.

$$x = 2t, \quad y = 10t^3, \quad t = -1$$

(b) Find $\frac{d^2y}{dx^2}$ of the following

$$x = \frac{1}{2}t^2, \quad y = \frac{1}{3}t^3, \quad t = 2.$$

(c) Determine the slope of the tangent line, then find the equation of the tangent line at the given value of the parameter.

$$x = \cos t, \quad y = 10\sin t, \quad t = \frac{\pi}{2}$$

(3) **(Bonus)** Solve any **two of them.**

(a) Find the area of the regions bounded by the parametric curves and the indicated values of the parameter.

$$x = 2\cot\theta, \quad y = 2\sin\theta^2, \quad 0 \le \theta \le \pi.$$

(b) Find the arc length of the curve

$$x = 3t + 2, \quad y = 4t - 4$$

where $0 \le t \le 2$.

(c) Find all points on the curve

$$x = t + 2, \quad y = t^3 - 3t$$

at which there are vertical and horizontal tangents.