

DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. No Attached papers. Transfer all your answers to the space provided

1. Find dy/dx .

$$x = t \sin t, \quad y = t^2 + 5t$$

Ans: _____

2. Find an equation of the tangent to the curve at the given point by both eliminating the parameter and without eliminating the parameter.

$$x = 4 + \ln t, \quad y = t^2 + 1, \quad (4, 2)$$

Ans: _____

3. Find an equation of the tangent to the curve at the given point.

$$x = 5 \sin t, \quad y = t^2 + t, \quad (0, 0)$$

Ans: _____

4. Find dy/dx and d^2y/dx^2 .

Ans: _____

$$x = e^t, \quad y = te^{-t}$$

For which values of t is the curve concave upward? (Enter your answer using interval notation.)

5. Find the exact length of the curve.

Ans _____

$$x = 1 + 6t^2, \quad y = 7 + 4t^3, \quad 0 \leq t \leq 5$$

6. Find the area bounded by Maria Agnesi's Witch curve defined below and, the horizontal line $y = 1$.

$$\begin{cases} x = 2 \cot t \\ y = 2 \sin^2 t, \end{cases}$$

Ans _____