MATH 201.1 (091)

Quiz 1 (Chap. 10.1-2) Duration: 20mn

Name: ID number:

1.)(7pts) Graph the curve and eliminate the parameter to find a Cartesian equation of the curve

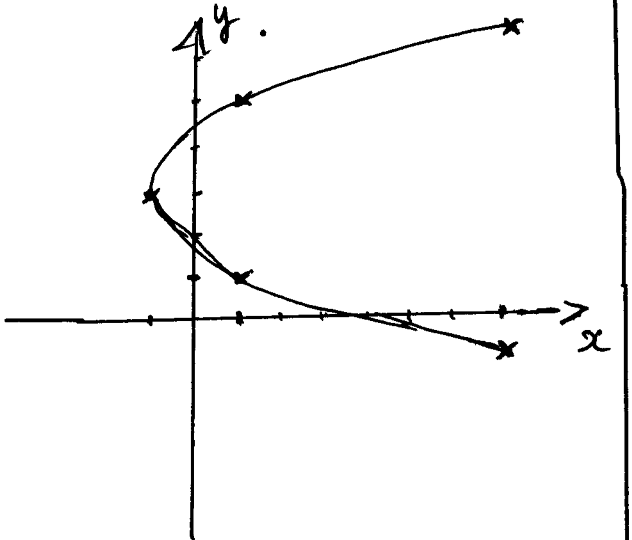
$$\begin{cases} x = 2t^2 - 1 \\ y = 3 - 2t, & t \in [-2, 2] \end{cases}$$

2.)(3pts) Find the length of the curve

$$\begin{cases} x = e^{2t} + e^{-2t} \\ y = 1 + 4t, & t \in [0, 1] \end{cases}$$

1)

t	-2	-1	0	1	2
x	7	1	-1	1	7
y	7	5	3	1	-1



From y, we get $t = \frac{3-y}{2}$. We substitute this value in x, and we find

$$\left(\frac{3-y}{2}\right)^2 = \frac{x+1}{2}$$

Let now $x \geq -1$.

- If $y \leq 3$, then $\frac{3-y}{2} = \sqrt{\frac{x+1}{2}}$, and $y = 3 - 2\sqrt{\frac{x+1}{2}}$
- If $y \geq 3$, then $\frac{3-y}{2} = -\sqrt{\frac{x+1}{2}}$, and $y = 3 + 2\sqrt{\frac{x+1}{2}}$.

2.)

$$L = \int_0^1 \sqrt{(2e^{2t} - 2e^{-2t})^2 + (4)^2}\, dt$$

$$= \int_0^1 \sqrt{4e^{4t} + 4e^{-4t} + 8}\, dt$$

$$= \int_0^1 \sqrt{(2e^{2t} + 2e^{-2t})^2}\, dt$$

$$= \int_0^1 (2e^{2t} + 2e^{-2t})\, dt$$

$$= \left[e^{2t} - e^{-2t}\right]_0^1$$

$$= \frac{e^4 - 1}{e^2}.$$