

Name: \_\_\_\_\_

ID number: \_\_\_\_\_

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

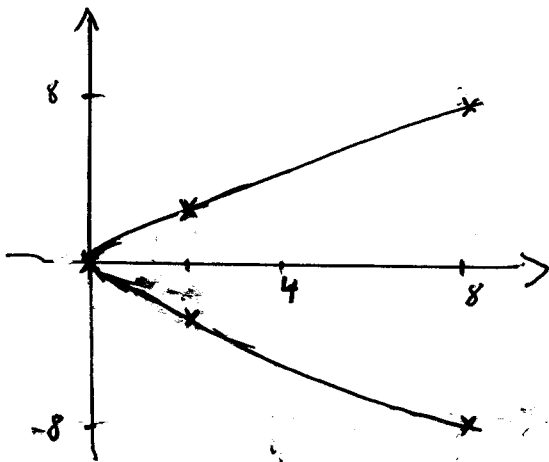
$$\begin{cases} x = 2t^2 \\ y = t^3, \quad t \in [-2, 2] \end{cases}$$

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

$$\begin{cases} x = 3t - t^3 \\ y = 3t^2, \quad t \in [0, 1] \end{cases}$$

1.)

t	-2	-1	0	1	2
x	8	2	0	2	8
y	-8	-1	0	1	8



• If  $y \leq 0$ , then  $y = -\left(\frac{x}{2}\right)^{3/2}$   
 $= -\frac{x}{2}\sqrt{\frac{x}{2}}$

2.)

$$\begin{aligned} L &= \int_0^1 \sqrt{(3-3t^2)^2 + (6t)^2} dt \\ &= \int_0^1 \sqrt{9 + 16t^2 + 9t^4} dt \\ &= \int_0^1 \sqrt{(3+3t^2)^2} dt \\ &= \int_0^1 (3+3t^2) dt \\ &= [3t + t^3]_0^1 \\ &= 4 \end{aligned}$$

Let  $x \geq 0$ .  
 Then,  $x = 2t^2 \Rightarrow t = \pm \sqrt{\frac{x}{2}}$   
 • if  $y \geq 0$ , then  $y = \left(\frac{x}{2}\right)^{3/2}$   
 $= \frac{x}{2}\sqrt{\frac{x}{2}}$