

Name: _____

ID number: _____

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

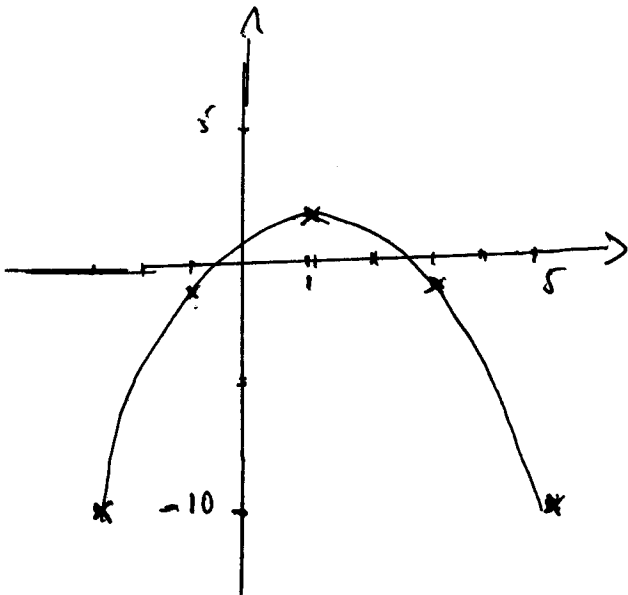
$$\begin{cases} x = 1 + 2t \\ y = 2 - 3t^2, \quad t \in [-2, 2] \end{cases}$$

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

$$\begin{cases} x = 1 + 3t^2 \\ y = 4 + 2t^3, \quad t \in [0, 1] \end{cases}$$

1.)

t	-2	-1	0	1	2
x	-3	-1	1	3	5
y	-10	-1	2	-1	-10



From x , we get $t = \frac{x-1}{2}$.

Substituting in y , we find

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

2.)

$$\begin{aligned} L &= \int_0^1 \sqrt{(6t)^2 + (6t^2)^2} dt \\ &= \int_0^1 \sqrt{36t^2(1+t^2)} dt \\ &= \int_0^1 6t\sqrt{1+t^2} dt \\ &= 6 \left[\frac{1}{3}(1+t^2)^{3/2} \right]_0^1 \\ &= 2 \left[(1+t^2)^{3/2} \right]_0^1 \\ &= 2(2\sqrt{2}-1). \end{aligned}$$