

UNIVERSITY OF MANITOBA

MATH 1700 D01

Assignment 5

This assignment is based on units 9 and 10.

1.

- (a) Eliminate the parameter to find a Cartesian equation of the curve $x = 4t^2 - 5$, $y = 2t + 3$.
- (b) Sketch the curve and indicate with an arrow the direction in which the curve is traced as t increases.

2.

Let $x = \sqrt[3]{t}$, $y = \sqrt[3]{t} - t$.

- (a) Find the points on the curve at which the tangent is either horizontal or vertical.
- (b) Find dy/dx and d^2y/dx^2 .

3.

Find the exact length of the curve $x = \cos 2t$, $y = \sin^2 t$, $0 \leq t \leq \pi$.

4.

Find the exact area of the surface obtained by rotating the curve $x = t^2$, $y = t - \frac{1}{3}t^3$, $0 \leq t \leq 1$ about the x -axis.

5.

Sketch the curve with the polar equation $r = -2 \sin \theta$.

6.

Find the slope of the tangent line to the polar curve $r = 2 \cos \theta$, at the point $\theta = \pi/3$.

7.

Find the area of the region that lies inside $r = 4 \cos \theta$ and outside $r = 2$.

8.

Find the exact length of the polar curve $r = 2^\theta$, with $0 \leq \theta \leq \pi$.