

Homework Set 3

DUE: FEB 24, 2020 (AT THE BEGINNING OF CLASS)

To be handed in:*Please write your solution to Problems 1 and 2 on a single sheet of paper!*

1. Find the equation in polar coordinates, that is, in the form $r = r(\theta)$, for the curve given in Euclidean coordinates by

$$(x^2 + y^2)^2 = 2(x^2 - y^2).$$

For 2 extra points: sketch a plot of this curve!

2. Consider the following vector-valued function $\vec{r}(t) = (2 \sin(4t), te^t, 1 + \sqrt{t})$. Compute the following:

- a) $\vec{r}'(t)$
- b) $\|\vec{r}'(t)\|^2$
- c) $\langle \vec{r}(t), \vec{r}'(t) \rangle$

NOT to be handed in (but recommended for you to practice with):

3. Textbook (5th edition) Section 11.7, Exercises 1-4, 7-10, 13-16, 21-24, 89-94
4. Textbook (5th edition) Section 12.1, Exercises 1-4, 13-14, 21-24
5. Textbook (5th edition) Section 12.2, Exercises 1-4, 16-20, 53-55, 61, 65