

1. (a) Sketch the curve by using parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as t increases.
- (b) Eliminate the parameter to find a Cartesian equation of the curve.

$$x = t^2$$

$$y = t^6$$

2. Explain why $y = x^5$ is not parametrized by $x = t^2$, $y = t^{10}$.
3. Find the equation for the tangent line to the curve at the point corresponding to a given parameter.

$$x = t^2 + 1$$

$$y = t^3 + 2, t=0.$$

4. Find dy/dx and d^2y/dx^2 . For which values of t is the curve concave upward? Also, find points where the tangent line is horizontal and vertical.

$$x = t - e^t$$

$$y = t + e^t$$

5. Use parametric equations for an ellipse, $x = a \cos \theta$, $y = b \sin \theta$, to find the area by the ellipse. (Hint: we only need to worry about $0 \leq \theta \leq 2\pi$, why?)

6. (a) Plot following points in polar coordinates.

i) (-2, 0) ii) (-3,3)

- (b) Plot the following region

$$0 < r \leq 2 \pi/4 \leq \theta \leq 3\pi/4$$

7. Sketch the following polar equation.

$$r = 2\theta \theta \geq 0$$

Pointers.

- 1) Be neat. If you aren't neat, give yourself room between lines and try to write big.

- 2) The standard for how much you should explain yourself should be that you want to produce a document that explains itself well and is easy to study from later. Don't be lazy. Challenge yourself and include your reasoning, this is where partial credit comes from on exams.

- 3) Write a rough draft of your homework then a final draft. Your best work comes from really thinking about things this will not happen the first time you write something up.

- 4) Rewrite your homework to correct errors after it's graded. This will make studying for the exam a lot more manageable.