

Math 222 Quiz 9

April 13, 2011

Your Name:

Your Section:

Instructions: You have 20 minutes to solve the following problems and the total score is 10 points.

1. (a). A line can be determined by:_____ (1 pt)(Get all possible answers)
A. Two points B. Two vectors C. A point on the line and a vector parallel to it
(b). Find parametrizations for the line through $A(-1, -3), B(4, 1)$ and the line segments with endpoints A, B . (3 pts)
2. $\vec{x}(t) = \begin{pmatrix} \sin t \\ t \end{pmatrix} . (-\infty < t < +\infty)$. Sketch the curve and indicate the direction of motion. Can this curve be the graph of a function $y = f(x)$? (3 pts)
3. $x = t^2, y = t^6 - 2t^4$ $(-\infty < t < +\infty)$. Find the Cartesian equation and sketch roughly (I just need the shape)(2 pts). Indicate the direction of motion.(1 pt)

Bonus 1: (a). Is parametric equation of one curve unique?(1 pt) Are the two curves the same and why? $x = e^t, y = e^{2t}$ and $x = t, y = t^2$ (1 pt)

(b). Think of an example such that $y = f(x)$ isn't differentiable somewhere, but we can find $x(t), y(t)$ as parametric equations that are differentiable everywhere. (Hint: cycloid)(2 pts)

Bonus 2: Suppose the orbit of the earth can be described with $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 (a \neq b)$. What's this curve called and where is the sun? (1 pt) One parametric equation is $x = a \cos(t), y = b \sin(t)$. Is this motion clockwise or counterclockwise?(1 pt). Find one interval of t corresponding to two years on the earth.(1 pt)