MA114 Summer 2018
Worksheet 22 – Parametric Equations – 7/23/18

1. (a) How is a curve different from a parameterization of a curve?

   (b) Parameterize the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

   (c) Do the two sets of parametric equations

   $$y_1(t) = 5\sin(t), x_1(t) = 5\cos(t), 0 \leq t \leq 2\pi$$

   and

   $$y_2(t) = 5\sin(t), x_2(t) = 5\cos(t), 0 \leq t \leq 20\pi$$

   represent the same parametric curve? Discuss.

2. Find a Cartesian equation for each curve.

   (a) $c(t) = (2\cos(t), 2\sin(t))$

   (b) $x = 3t - 5, y = 2t + 3$

3. Represent the curve $y = x^3$ from $x = 0$ to $x = 2$ as a parametric curve traced out exactly once on the indicated interval.

4. Find a parametrization $(x(t), y(t))$ for the curve $y = x^2$ satisfying $x(0) = 3, y(0) = 9$.

5. Describe $c(t) = (\sec(t), \tan(t))$ for $0 \leq t \leq \pi/2$ in the form $y = f(x)$. Specify the domain of x.

6. A particle travels from the point $(2, 3)$ to $(1, -1)$ along a straight line over the course of 5 seconds. Write down a set of parametric equations that describe the position of the particle for any time between 0 and 5 seconds.