

Parametric GraphIt Exploration Questions

1. Complete the table below.

t	$x(t)=\sin(t)$	$y(t)=\cos(t)$	Coordinate (x,y)
0.0	0	1	(0,1)
0.5			
1.0			
1.5			
2.0			
2.5			
3.0			
3.5			
4.0			
4.5			
5.0			
5.5			
6.0			
6.5			
7.0			

- Plot the coordinates in the same order as in the table, smoothing the lines from point to point. What does the graph resemble?
- Draw arrows on your graph to indicate the direction or orientation of the graph.
- How could you adjust one of the equations so that the orientation would be going in the opposite direction?

For questions 5-6 use the equations $x(t) = \frac{1}{2}t^3$ and $y(t) = \frac{1}{4}t^6$.

5. When graphed, what type of function do these parametric equations look like? Plot a few data points from this function to see if you are correct.
6. How can we manipulate the equations of $x(t)$ and $y(t)$ in order to express y as a function of x ? (Hint: Solve $x(t)$ for t , i.e. express t in terms of x , then substitute that into $y(t)$.) How is this equation related to your answer to #5?
7. There are many other ways to get the curve given in problem 5 from a pair of parametric equations. For example: $x(t) = t$, $y(t) = t^2$ will give the same graph, as will the pair $x(t) = t^{1/3}$, $y(t) = t^{2/3}$. If $x(t) = t + 1$, what value for $y(t)$ will give yet another way of representing the curve given in problem 5?
8. Now find parametric equations that give rise to the function $y = x^3 + 2$, oriented from left to right, keeping in mind that there are many possible answers. This process is called parametrization.