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			

2. Plot the coordinates in the same order as in the table, smoothing the lines from point to point. What does the graph resemble?

3. Draw arrows on your graph to indicate the direction or orientation of the graph.

4. 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.