MATH 211: 12-6 WORKSHEET

Use a computer graphing tool to graph the following polar functions.

(1) $r(\theta) = \theta$, $r(\theta) = \theta^2$, and $r(\theta) = e^\theta$. What shapes do you get? What other polar functions would give a similar shape?

(2) $r(\theta) = K \csc\theta$, where K is a fixed constant. Can you write an equation $y = f(x)$ in rectangular coordinates with the same graph? Explain why this polar function gives that graph.

(3) $r(\theta) = \sin(\theta)$ and $r(\theta) = \cos(\theta)$. Do you know rectangular equations which give the same graphs? Explain why they give the same graphs.

(4) $r(\theta) = A\cos(\theta) + B\sin(\theta)$, where A and B are constants. Can you describe the shape you get in terms of A and B? Do you know a rectangular equation which gives the same graph? Explain why they give the same graph.

(5) $r(\theta) = \sin(N\theta)$ and $r(\theta) = \cos(N\theta)$ for N a positive integer. What shapes do you get by varying N? Describe the pattern based upon N.

(6) $r(\theta) = \sin(\sqrt{2}\theta)$ and $r(\theta) = \sin(\pi\theta)$. Why do you think you get this pattern?