MATH 122: Calculus II

Some Hints and Answers for Assignment 32

I: Section 9.3: Section 9:3: 13, 42, 51

Exercise 13: Write $4\csc\theta$ as $\frac{4}{\sin\theta}$. Graph is horizontal line $y = 4$.

Exercise 42: Note $r^2 \sin 2\theta = r^2 2\sin\theta\cos\theta = 2(r\cos\theta)(r\sin\theta)$ The curve is a hyperbola in the plane.

Exercise 51: Use formula derived in class on Friday: Slope is $\frac{\sqrt{3}}{3}$

II: Series Solution of Differential Equations: Series Solutions: 2, 3, 7

Exercise 2: $y' = -y$ yields $y'' - y' = y, y^{(3)} = -y'' = -y, y^{(4)} = -y(3) = y, etc$, so $y^{(n)} = (-1)^n y$. Maclaurin series looks like

$$\sum_{n=0}^{n=\infty} \frac{(-1)^n}{n!} x^n$$

Exercise 3: Taylor series looks like

$$\sum_{n=0}^{n=\infty} \frac{(-1)^{(n-1)} 2^n}{n!} (x-1)^n$$

Exercise 7: Series is

$$\sum_{k=0}^{\infty} \frac{2}{k!} x^{3k}$$