Review 3:

This review is meant as a general overview of SOME of the topics covered in class up to date. The test questions will not only cover this material but will also cover sections 12.3-12.10, 12.12, 11.1-11.2, You should know all definitions, theorems, and techniques outlined in the text, as well as be comfortable with the properties and examples throughout the above sections. Below I provide some sample problems that cover material from class. I am in no way promising any of these problems will be on the test. They are solely for practice. Other good sample problems can be found in 'suggested problems' sections of your homework assignments, lecture notes, and class handouts, as well as the before mentioned places.

1. Explain the differences between absolutely convergent, conditionally convergent, and divergent series. Make a chart with three columns: Name of different tests, what the test are, and what they tell you.

2. Test the series for convergence or divergence.

   - $\sum_{n=1}^{\infty} \frac{n-1}{n^2+n}$
   - $\sum_{n=1}^{\infty} \frac{(-3)^{n+1}}{2^{3n}}$
   - $\sum_{n=1}^{\infty} \frac{n!}{e^{n^2}}$
   - $\sum_{n=1}^{\infty} (\sqrt[n]{2} - 1)^n$
   - $\sum_{n=1}^{\infty} \sin n$
   - $\sum_{n=1}^{\infty} n^2 e^{-n^3}$

3. Express the functions below as power series and determine their radius of convergence.

   - $k(x) = \frac{x^2}{4x+1}$
   - $h(x) = \arctan(x/3)$
   - $f(x) = \frac{7x-1}{3x^2+2x-1}$

4. Find the Taylor series centered at $a = \pi/2$ for $f(x) = \sin x$.

5. Describe and graph the curve of the parametric equations using arrows to indicate direction.

   - $x = 2\sin t$, $y = 3\cos t$, $0 \leq t \leq 2\pi$.
   - $x = 2 + \sin t$, $y = 3 - \cos t$, $0 \leq t \leq 2\pi$.

6. Find dy/dx for the following parametric equations.

   - $x = 4 + t^3$, $y = t^2 - t^3$.
   - $x = t - e^t$, $y = t + e^t$.

7. Find an equation of the tangent line to the curve at the given value.

   - $x = 3t^3 + 2$, $y = t^2 - 5t$; $t = -1$
   - $x = \cos(\theta)$, $y = \sin(\theta/2)$; $(-1, 1)$.