1. Do WebAssign 10.1&2. Remember that the WebAssign will be reopened three days before Exam IV for you to review the problems. You will be allowed to improve your score by a maximum or three points. Additional attempts will not be given.

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2. Use a fourth-degree Taylor approximation for x near 0,

$$\cos(x) \approx 1 - \frac{x^2}{2!} + \frac{x^4}{4!},$$

to explain why $\lim_{x \to 0} \frac{1 - \cos(x)}{x^2} = \frac{1}{2}$

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3. The integral $\int_0^1 (\sin(t)/t)dt$ is difficult to approximate using, for example, left Riemann sums or the trapezoid rule because the integrand $(\sin(t)/t)$ is not defined at $t = 0$. However, this integral converges; its value is 0.94608... Estimate the integral using Taylor polynomials for $\sin(t)$ about $t = 0$ (a) of degree 3 and (b) or degree 5.

4. Write the general term of the binomial series for $(1+x)^p$ about $x = 0$.

Find the radius of convergence of this series.

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5. By recognizing the series as a Taylor series evaluated at a particular value of x, find the sum of the following convergent series.

$$1 - \frac{100}{2} + \frac{10000}{4!} - \cdots + \frac{(-1)^n \cdot 10^{2n}}{(2n)!} + \ldots$$

Using Taylor Series

Section 10.3
November 8, 2016

Name:
Math 129 - 01

Understand	Know how to compute the coeffiecients of a Taylor polynomial by differentiation
Understand	Know, without calculating, the coefficients of e^x, $\sin(x)$, $\cos(x)$ and geometric series.
Apply	Obtain coefficients for a new function by variable substitution into one of the known functions.
Apply	Obtain coefficients for a new function by differentiating or integrating a known function.
Apply	Obtain coefficients for a new function by addition, multiplication or function composition.

1. Compute the Taylor Series about $x = 0$ for the functions below:

   $f(x) = e^x$

   $g(x) = \sin(x)$

   $h(x) = \cos(x)$

2. Find an appropriate substitution to compute the following Taylor Series about $x = 0$ without taking any more derivatives:

   $\tilde{f}(y) = e^{-y^2}$

   $\tilde{g}(z) = \sin(4z)$

Quiz (Leave this space blank)