

WORKSHEET FOR 4/10/2009

Reading assignment. p. 601-607

Homework due Monday. 2, 3, 4, 7, 12

Exercises:

- (1) Let $f(x) = 1/x$.
 - (a) Write down an expression for $f^{(n)}(x)$.
 - (b) Write down an expression for $f^{(n)}(1)$.
 - (c) Find the Taylor series for $f(x)$ centered at $x_0 = 1$. Find its radius of convergence
 - (d) Find the power series for $f(x)$ centered at 1 by considering the power series for $\frac{1}{1-x}$.
- (2) Find the Taylor series for $f(x) = \ln x$ centered at $x = 1$ directly. Find the power series for f by integrating your answer from (1).
- (3) Find the Maclaurin series for $f(x) = \sin x$ (you can check your answer from the previous section). Use this to evaluate $\lim_{x \rightarrow 0} \frac{\sin x - x^3}{x^3}$.