

MATH 250
SPRING 2012
EXAM 5

NAME:

1. 10 pts. each Find the n th-order Taylor polynomial $P_n(x)$ with center x_0 for each function f .

 - (a) $f(x) = \sin 2x$, with $n = 4$ and $x_0 = 0$.
 - (b) $f(x) = \tan x$, with $n = 4$ and $x_0 = \pi/4$.
2. 15 pts. Determine the interval of convergence of $\sum_{k=0}^{\infty} \frac{4}{n^2 + 2n} (x - 3)^n$
3. 15 pts. Find the first four nonzero terms in a power series expansion about $x_0 = 0$ for a general solution to $y' - y = 0$.
4. 20 pts. Find the general solution to $y'' - x^2y' - xy = 0$ in the form of a power series about $x_0 = 0$. The answer should include a general formula for the coefficients.
5. 20 pts. Find the first four nonzero terms in a power series expansion about $x_0 = 2$ for a general solution to $x^2y'' - y' + y = 0$.