Mini-exam 5 (10 points total) Math 141, Summer 2015

Name:

Problem 1 Find the interval of convergence for the Taylor series $\sum_{n=0}^{\infty} \dfrac{(x-3)^n}{n+1}$.

(a) $[2, 4)$

(b) $(2, 4]$

(c) $(-1, 1]$

(d) $[-1, 1)$

(e) $[-3, 3)$

Problem 2 Evaluate the indefinite integral $\int \frac{t}{1-t^2} dt$ as a power series.

(a) $\sum_{n=0}^{\infty} \frac{t^{2n+1}}{2n+1} + C$

(b) $\sum_{n=0}^{\infty} t^{2n} + C$

(c) $\sum_{n=0}^{\infty} \frac{t^{2n+2}}{2n+2} + C$

(d) $\sum_{n=0}^{\infty} \frac{t^n}{n+1} + C$

(e) $\sum_{n=0}^{\infty} \frac{t^2 n}{2n} + C$

Problem 3 Find the Maclaurin series of e^{6x}.

(a) $\sum_{n=0}^{\infty} \frac{6^n x^n}{n!}$

(b) $\sum_{n=0}^{\infty} \frac{(-6)^n x^n}{n!}$

(c) $\sum_{n=0}^{\infty} \frac{(6x)^n}{n}$

(d) $\sum_{n=0}^{\infty} \frac{6^n x^n}{2n+1}$

Problem 4 Derive the MacLaurin series of $\sin x = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$. Write out your solution carefully.

Problem 5 Let $f(x) = \ln(x) - 1$, and $T_4(x)$ be the fourth degree Taylor polynomial $T_4(x)$ for $f(x)$ centered at e. Use Taylor's Inequality to estimate the accuracy of the approximation $f(x) \approx T_4(x)$ when $\frac{e}{2} \leq x \leq \frac{3e}{2}$. Write out your solution carefully.

Feedback:

1. Any comments?