Name: _____ Date:_____ **Corrective Assignment**

End of Unit 10 CA – Infinite Sequences and Series

1. Let f be the function defined by $f(x) = 3x\cos x$. What is the coefficient of x^5 in the Taylor Series for f about $x = 0$?

2. Determine the number of terms required to approximate the sum of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^4}$ with an error less than 0.0001.

(A) 7 (B) 8 (C) 9 (D) 10

3. Find the third-degree Taylor Polynomial for the function $f(x) = \sqrt{x}$ about $x = 2$.

4. What is the coefficient of x^3 in the Maclaurin series for the function $\left(\frac{1}{1-x}\right)^2$?

5. The function f has derivatives of all orders for all real numbers and $f^{(4)}(x) \leq \frac{1}{2}$. If a third-degree Taylor Polynomial for f about $x = 0$ is used to approximate f on $[0,1]$. What is the Lagrange error bound for the maximum error on interval $[0,1]$ in the approximation of $f(1)$?

(A) $\frac{1}{2}$ (B) $\frac{1}{8}$ (C) $\frac{1}{24}$ (D) $\frac{1}{48}$

6. What is the alternating series error bound, if the series $\sum_{n=1}^{\infty}(-1)^{n+1}\frac{1}{5n+2}$ is approximated by the partial sum with 15 terms?

(A) $\frac{1}{15}$ (B) $\frac{1}{16}$ (C) $\frac{1}{77}$ (D) $\frac{1}{82}$

7. $\max_{0\leq x\leq 2}\left|f^{(5)}(x)\right| = 3.6$ $\max_{0\leq x\leq 2}\left|f^{(6)}(x)\right| = 8.1$ $\max_{0\leq x\leq 2}\left|f^{(7)}(x)\right| = 11.3$

Let $P(x)$ be the fifth-degree Taylor Polynomial for a function f about $x = 0$. Information about the maximum of the absolute value of selected derivatives of f over the interval $0 \leq x \leq 2$ is given in the table above. What is the smallest value of k for which the Lagrange error bound guarantees that $|f(0.2) - P(0.2)| \leq k$?

8. Find the interval of convergence of the power series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-3)^n}{n3^n}$.

9. What is the coefficient of $(x-2)^4$ in the Taylor Polynomial for $f(x) = e^{4x}$ about $x = 2$?

10. A series expansion for function $f(x) = e^{3x}$ is given by

(A) $1 + 3x + \frac{9x^2}{2} + \frac{9x^3}{2} + \cdots$

(B) $1 + 3x + \frac{3x^2}{2!} + \frac{3x^3}{3!} + \cdots$

(C) $1 - 3x + \frac{9x^2}{2} - \frac{9x^3}{2} + \cdots$

(D) $1 - 3x + \frac{3x^2}{2!} - \frac{3x^3}{3!} + \cdots$

11. Let f be the function with initial condition $f(0) = 0$ and derivative $f'(x) = e^{3x}$. Write the first four nonzero terms and the general term of the Maclaurin series for f.

12. Find the radius of convergence for the power series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}x^n}{6^n}$.

Answers to End of Unit 10 Corrective Assignment

1. $\frac{1}{8}$	2. D	3. $f(x) = \sqrt{2} + \frac{\sqrt{2}}{4}(x-2) - \frac{\sqrt{2}}{32}(x-2)^2 + \frac{\sqrt{2}}{128}(x-2)^3$	
4. 4	5. D	6. D	7. 7.2×10^{-7}
8. $0 < x \leq 6$	9. $\frac{32e^8}{3}$	10. A	
11. $f(x) = x + \frac{3}{2}x^2 + \frac{3}{2}x^3 + \frac{9}{8}x^4 + \cdots + \frac{3^n x^{n+1}}{(n+1)n!}$		12. 6	