

10.15 Representing Functions as Power Series

Calculus

Name: _____

CA #1

1. What is the coefficient of x^5 in the Taylor series for the function $f(x) = e^x \sin x$ about $x = 0$?

2. If the function f is defined by $f(x) = \sum_{n=0}^{\infty} \frac{x^{2n}}{n!}$, then $f'(x) = ?$ Write the first four nonzero terms and the general term of the Taylor series about $x = 0$.

3. Let f be the function defined by $f(x) = e^{3x}$. Find the Maclaurin series for the derivative f' . Write the first four nonzero terms and the general term.

4. Find the third-degree Taylor Polynomial for $f(x) = \sin x \cos x$ about $x = 0$.

5. If $f'(x) = \frac{4}{1+x}$ and $f(0) = 0$, write the first four nonzero terms and the general term of the Maclaurin series for $f(x)$.

Answers to 10.15 CA #1

1. $-\frac{1}{30}$	2. $f'(x) = 2x + 2x^3 + x^5 + \frac{x^7}{3} + \dots + \frac{2nx^{2n-1}}{n!}$	3. $f'(x) = 3 + 9x + \frac{27x^2}{2} + \frac{27x^3}{2} + \dots + \frac{3n(3x)^{n-1}}{n!}$
4. $T = x - \frac{2}{3}x^3$		5. $f(x) = 4x - 2x^2 + \frac{4}{3}x^3 - x^4 + \dots + \frac{(-1)^n 4x^{n+1}}{n+1}$