10.15 Representing Functions as Power Series

Calculus Name: _____ **CA #2**

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

2. If the function f is defined by $f(x) = \sum_{n=0}^{\infty} \frac{x^{5n}}{n!}$, 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 $f(x) = \cos \pi x$. 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 $f(x) = \frac{1}{(1+x)^2}$ 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 #2

1. $-\frac{1}{30}$	2. $f'(x) = 5x^4 + 5x^9 + \frac{5x^{14}}{2} + \frac{5}{6}x^{19} + \cdots + \frac{5nx^{5n-1}}{n!}$	3. $f'(x) = -\pi^2 x + \frac{\pi^4 x^3}{6} - \frac{\pi^6 x^5}{120} + \frac{\pi^8 x^7}{5040} + \cdots + \frac{(-1)^n (2n)\pi^{2n} x^{2n-1}}{(2n)!}$
4. $T = 1 - 2x + 3x^2 - 4x^3$		5. $f(x) = 4x + 2x^2 + \frac{4}{3}x^3 + x^4 + \cdots + \frac{4x^{n+1}}{n+1}$