10.11 Taylor Polynomial Approximations

Calculus Name: ________________________________ **CA #2**

1. Find the third-degree Taylor Polynomial for $f(x) = \ln x^2$ about $x = 1$.

2. Let f be the function with third derivative $f'''(x) = 18x^{-4}$. What is the coefficient of $(x-1)^4$ in the fourth-degree Taylor polynomial of f about $x = 1$?

3. The function f has derivatives of all orders for all real numbers with $f(2) = 1$, $f'(2) = -3$, $f''(2) = 7$, and $f'''(2) = 14$. Using a third-degree Taylor Polynomial for f about $x = 2$, what is the approximation of $f(2.1)$?

4. The third-degree Taylor Polynomial for a function f about $x = 1$ is given by $\frac{5(x-1)^4}{42} + \frac{2(x-1)^3}{21} - \frac{(x-1)^2}{8} + \frac{3(x-1)}{7} + 4$. What is the value of $f'''(1)$?

5. Which of the following polynomial approximations is the best for e^{4x} near $x = 0$?

(A) $1 + 4x + 16x^2 + 64x^3$

(B) $1 + 4x + 8x^2 + \frac{32}{3}x^3$

(C) $e^4 + 4e^4x + 16e^4x^2 + 64e^4x^3$

(D) $1 + x + \frac{x^2}{2} + \frac{x^3}{6}$

Answers to 10.11 CA #2

1. $f(x) = 2(x-1) - (x-1)^2 + \frac{2}{3}(x-1)^3$	2. -3	3. $f(2.1) \approx .737$
4. $f'''(1) = \frac{4}{7}$	5. B	