10.11 Taylor Polynomial Approximations

Calculus Name: _____ **CA #1**

1. Find the third-degree Taylor Polynomial for $f(x) = e^{2x}$ about $x = 1$.

2. Let f be the function with third derivative $f'''(x) = 12x^{-3}$. 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 $f(4) = 1$, $f'(4) = 3$, $f''(4) = 5$, and $f'''(4) = 12$. Using a third-degree Taylor Polynomial for f about $x = 4$, what is the approximation of $f(4.1)$?

4. The third-degree Taylor Polynomial for a function f about $x = 0$ is $\frac{x^3}{128} - \frac{x^2}{16} + \frac{x}{8} + 4$. What is the value of $f'''(0)$?

5. Which of the following polynomial approximations is the best for $\sin 2x$ near $x = 0$?

(A) $2x - 8x^3$ (B) $2 - \frac{4}{3}x^2$ (C) $2x - \frac{4}{3}x^3$ (D) $2 - \frac{4}{3}x$

Answers to 10.11 CA #1

1. $f(x) = e^2 + 2e^2(x-1) + 2e^2(x-1)^2 + \frac{4}{3}e^2(x-1)^3$	2. $-\frac{3}{2}$	3. $f(4.1) \approx 1.327$
4. $f'''(0) = \frac{3}{64}$	5. C	