Let $f$ be a function that has derivatives of all orders for all real numbers. Assume $f(1) = 3$, $f'(1) = -2$, $f''(1) = 2$, and $f'''(1) = 4$.

1. Write the second-degree Taylor polynomial for $f(x)$ about $x = 1$ and use it to approximate $f(0.7)$.

2. Write the third-degree Taylor polynomial for $f(x)$ about $x = 1$ and use it to approximate $f(1.2)$.

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The Taylor series about $x = 5$ for a certain function converges to $f(x)$ for all $x$ in the interval of convergence. The $n$th derivative of $f(x)$ at $x = 5$ is given by $f^{(n)}(5) = \frac{(-1)^n n!}{2^n (n + 2)}$, and $f(5) = \frac{1}{2}$.

3. Write the third-degree Taylor polynomial for $f(x)$ about $x = 5$.

4. Find the radius of convergence of the Taylor series representation for $f(x)$ about $x = 5$. 
The Maclaurin series for \( f(x) \) is given by \[ 1 + \frac{x}{2!} + \frac{x^2}{3!} + \frac{x^3}{4!} + \ldots + \frac{x^n}{(n+1)!} + \ldots \]

5. Find \( f'(0) \) and \( f^{(17)}(0) \).

6. Let \( g(x) = xf(x) \). Write the Maclaurin series for \( g(x) \), showing the first three nonzero terms and the general term.

7. Let \( f \) be the function given by \( f(x) = \ln(5 - x) \). Find the third degree Taylor polynomial for \( f \) about \( x = 4 \).

8. If \( f(x) = x\cos(2x) \), write the Taylor Series for \( f \) about \( x = 0 \)?