Name: _____ AP Calc BC Homework 9-2A

"Build" each of the following Maclaurin series for each function from the ones that are known. Write the first four nonzero terms and then give the summation form.

1. $f(x) = x^2 \sin x$

2. $f(x) = \cos(2x)$

3. $f(x) = \tan^{-1}(x^2)$

4. $f(x) = \ln(1-x)$

5. $f(x) = \dfrac{e^x - 1}{x}$

6. $f(x) = \dfrac{1 - x^2 - e^{-x^2}}{x^4}$

7. Let f be a function defined by $f(x) = \dfrac{1}{3} + \dfrac{2}{3^2}x + \dfrac{3}{3^3}x^2 + \cdots + \dfrac{n+1}{3^{n+1}}x^n + \cdots$ Find $\lim\limits_{x \to 0} \dfrac{f(x) - \dfrac{1}{3}}{x}$.