

Name : _____

1. Find the Maclaurin series for f using the definition. Verify your answer with Table 1 and Wolfram|Alpha.

a. $f(x) = \frac{1}{1-x}$

b. $f(x) = \ln(1+x)$

c. $f(x) = 2^x$

2. Find the Taylor series for $f(x)$ centered at $x = a$.

a. $f(x) = x^4 - 3x^2 + 1$ and $a = 1$

b. $f(x) = \sqrt{x}$ and $a = 16$. Hint: See Example 8 on page 766. See also: overleaf.com/read/krtzsqgykktb

3. The Maclaurin series for $\arctan x$ is $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1}$ for $-1 < x < 1$.
- Determine the Maclaurin series for $x^3 \arctan x$.
 - Determine the Maclaurin series for $\int x^3 \arctan x \, dx$. (Hint: use term-by-term integration, Sec 11.9).
 - Determine a series that represents $\int_0^{0.1} x^3 \arctan x \, dx$. (Hint: follow Example 11b pg 769).
 - If the first two non-zero terms of the series are used to estimate the value of the definite integral from the previous part, provide a bound on the error of this estimate. (Hint: follow Example 11b pg 769).