Calculus Study Guide: 10.7

Find the first 3 terms of the Maclaurin polynomial for g(x) = $\frac{1}{1+x}e^x$

$\left(1-x+x^2-x^3\right)\left(1+x+\frac{x^2}{2}+\frac{x^3}{6}\right)$

$\left(1+x+\frac{x^2}{2}+\frac{x^3}{6}\right)-x-x^2-\frac{x^3}{2}+x^2+x^3-x^3$

$1+\frac{x^2}{2}-\frac{x^3}{3}$

Find the first 4 terms of the Maclaurin series for h(x) = $\frac{1}{1-x^3}$

$1+x^3+x^6+x^9$

Use the Maclaurin expansion for e^{-x^2} to express $\int_0^x e^{-t^2}dt$ as an alternating series.

$e^x = 1+x+\frac{x^2}{2}+\frac{x^3}{6}+\cdots$

$e^{-x^2} = 1-x^2+\frac{x^4}{2}-\frac{x^6}{6}+\cdots$

$\int\left(1-x^2+\frac{x^4}{2}-\frac{x^6}{6}\right)dx = x-\frac{x^3}{3}+\frac{x^5}{10}-\frac{x^7}{42}+\cdots\Big|_0^1$

$\frac{x^{2n-1}}{(2n-1)(n-1)!}$

How many terms of the infinite series are needed to approximate the integral for x = 1 with an error less than 0.001?

$1-\frac{1}{3}+\frac{1}{10}-\frac{1}{42}+\frac{1}{192}\quad\frac{1}{(2n-1)(n-1)!}<0.001$

if $n=6$

Include 5 terms

first omitted term = $\frac{1}{7200}$