

**Worksheet #13**

(1) Use the binomial series to expand  $f(x) = (8 + x)^{1/3}$  as a power series. State the radius of convergence.

(2) Use a known Maclaurin series to obtain the Maclaurin series for  $f(x) = x \cos(\frac{x}{2})$ .

(3) Evaluate the indefinite integral as an infinite series.

$$\int \frac{e^x - 1}{x} dx$$

(4) Use series to evaluate

$$\lim_{x \rightarrow 0} \frac{x - \ln(1 + x)}{x^2}$$

(5) Find the sum of the series.

$$\sum_{n=0}^{\infty} \frac{(-1)^n \pi^{2n+1}}{4^{2n+1} (2n + 1)!}$$