

**Extension Practice: Taylor & Maclaurin Polynomial Practice (Sections 9.2 & 9.3)**

Use the table of Maclaurin series. Construct the first three nonzero terms and the general term of the Maclaurin series generated by the function, and give the interval of convergence.

1.  $f(x) = \sin^2 x$  [Hint: Use  $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$ ]

2. 
$$f(x) = \begin{cases} \frac{1 - \cos x}{x^2} & \text{if } x \neq 0 \\ \frac{1}{2} & \text{if } x = 0 \end{cases}$$

3.  $f(x) = \sinh x = \frac{e^x - e^{-x}}{2}$  [This is the hyperbolic sine function.]

4.  $f(x) = \cosh x = \frac{e^x + e^{-x}}{2}$  [This is the hyperbolic cosine function.]

Evaluate the indefinite integral as an infinite series.

5.  $\int \frac{\sin x}{x} dx$

6.  $\int \frac{1}{1+x^7} dx$

7. Use your results from question 6 to approximate  $\int_0^{0.5} \frac{1}{1+x^7} dx$  correct to within  $10^{-7}$ .