

Series 9 – Using Series

Limits: Replace each function by its Maclaurin series to help evaluate each limit.

$$(1) \quad \lim_{x \rightarrow 0} \frac{\sin(3x)}{x}$$

$$(2) \quad \lim_{x \rightarrow 0} \frac{1 - \cos(2x)}{x^2}$$

$$(3) \quad \lim_{x \rightarrow 0} \frac{\ln(1+x)}{\sin(2x)}$$

$$(4) \quad \lim_{x \rightarrow 0} \frac{1 - e^{4x}}{x}$$

Integrals: Replace each function by its Maclaurin series to help approximate each integral. Determine how many terms must be used to assure that the | error | is less than the given number.

(5) $\int_0^{0.9} \cos(x^2) dx$ with an error less than 0.005

(6) $\int_0^{0.5} \frac{1}{1+x^4} dx$ with an error less than 0.001

(7) $\int_0^1 e^{-x^2} dx$ with an error less than 0.05