

Problems - Sections 58, 59

(2) Obtain the Taylor series for $f(z) = e^z$ centered at $z = 1$ in two different ways.

(a) Find $f^{(n)}(1)$ for $n = 0, 1, 2, \dots$ then use the Taylor series formula.

(b) Write $e^z = e^{z-1}e$ then use the known Maclaurin series for e^z .

(7) Find the Taylor series for $\frac{1}{1-z}$ centered at $z = i$.

(13) Show that for $0 < |z| < 4$,

$$\frac{1}{4z - z^2} = \frac{1}{4z} + \sum_{n=0}^{\infty} \frac{z^n}{4^{n+2}}$$