

[gex94] **Complementary error function: asymptotic expansion**

- (a) Employ the Mathematica command `Series` to determine the first n terms of the asymptotic expansion for the complementary error function $\operatorname{erfc}(z)$ with n chosen large enough to recognize the pattern.
- (b) State the asymptotic form as an infinite sum in closed form.
- (c) Determine the first two terms of the asymptotic expansion from the definition,

$$\operatorname{erfc}(z) = \frac{2}{\sqrt{\pi}} \int_z^{\infty} dt e^{-t^2},$$

via two successive integrations in part.

Hint: For the first step in (c) use $e^{-t^2} = (-1/2t)(-2te^{-t^2})$.

Solution: