MTH101: Tutorial 6

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Example 1.1

Determine the location and order of the zeros.

- $(z+8i)^4$
- $(z^4-81)^3$
- $\sin^4 \frac{1}{2}z$

Example 1.2

Determine the location of the isolated singularities and also state the order for poles.

- $\dfrac{1}{(z+2i)^2} - \dfrac{z}{z-i} + \dfrac{z+1}{(z-i)^2}$
- $\tan \pi z$
- $\dfrac{\sin z}{z^4}$

Example 2.1

Compute the integral

$$\int_{\gamma} f(z)\, dz$$

where γ *is the counterclockwise circle with center* 0 *and radius* 2 *and*

$$f(z) = ze^{1/z} + \frac{z}{z+1}$$

Example 2.2

Compute the real integral

$$\int_0^{2\pi} \frac{1}{\sqrt{2} - \cos\theta}\, d\theta$$

Example 2.3

Compute the real integral

$$\int_{-\infty}^{\infty} \frac{1}{(x-1)(x^2+1)}\, dx$$