Answer on Question #50049 - Math - Complex Analysis

$$f(1/z) = \frac{1/z^3 + 1/z + 1}{1 + 1/z^2} = \frac{1}{z}\frac{z^3 + z^2 + 1}{z^2 + 1}$$

Since $\frac{z^3+z^2+1}{z^2+1}$ is analytic in 0, we conclude that 0 is a pole of the first order for $f(1/z)$, so ∞ is a **pole of the first order** for f.

$h(z) = g(1/z)\ 1 \neq z \cdot \sin(z)$ can be expanded at zero as $h(0) = 1$ and then $h(z) = \sum_n \frac{(-z)^{2n}}{(2n+1)!}$ is analytic at zero so g has **removable singularity** at ∞