Assignment 3

MA06 Complex Analysis Deadline: 17:00, Thursday, Dec 21, 2023

1. Use (3.1.1) of Definition 3.1 to find $f'(z)$ for the given function $f(z) = 9iz + 2 - 3i$. (Hint: Example 3.1.1)

2. Use the rules of differentiation to find $f'(z)$ for the given function.

   (a) $f(z) = (2-i)z^5 + iz^4 - 3z^2 + i^6$

   (b) $f(z) = \frac{iz^2-2z}{3z+1-i}$

3. Use L'Hopital's rule to compute the given limit: $\lim_{z\to i} \frac{z^7+i}{z^{14}+1}$.

4. Use Theorem 3.5 to show that the given function is analytic in an appropriate domain.
   $f(z) = \frac{x-1}{(x-1)^2+y^2} - i\frac{y}{(x-1)^2+y^2}$, where x, y are real numbers.
   Notice:
   Please write your Email title as "A{assignment number}-{Your Student ID}-{Your Name}".