Assignment 3

MA06 Complex Analysis Deadline 11:59 AM, 20181218

1. Use (3.1.1) of Definition 3.1 to find $f'(z)$ for the given function $f(z) = 15z^2 - 4z + 1 - 3i$. (Hint: Example 3.1.1)
2. Use the alternative definition (3.1.12) (in the Page 15 of the Lecture 3 slides) to find $f'(z)$ for the given function $f(z) = 5z^2 - 10z + 8$.
3. Use the rules of differentiation to find $f'(z)$ for the given function.
   (a) $f(z) = 5(iz)^3 - 10z^2 + 3 - 4i$
   (b) $f(z) = \frac{iz^2-2z}{3z+1-i}$
4. Use L'Hopital's rule to compute the given limit: $\lim_{z\to 1+i} \frac{z^5+4z}{z^2-2z+2}$.
5. Show that the given function $f(z) = \bar{z}^2$ is not analytic at any point. (Hint: Example 3.2.2)
6. 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 Name and Student ID when you submit.