

THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
2018 Fall MATH2230
Homework Set 4(Due on)

All the homework problems are taken from Complex Variables and Applications, Ninth Edition, by James Ward Brown/Ruel V. Churchill.

P.70-71

2. Use the theorem in Sec. 23 to show that $f'(z)$ and its derivative $f''(z)$ exist everywhere. and find $f''(z)$ when

(a) $f(z) = iz + 2$; (b) $f(z) = e^{-x}e^{-iy}$; (c) $f(z) = z^3$; (d) $f(z) = \cos x \cosh y - i \sin x \sinh y$.

3. From results obtained in Secs. 21 and 23. determine where $f'(z)$ exists and find its value when

(a) $f(z) = 1/z$; (b) $f(z) = x^2 + iy^2$; (c) $f(z) = z\text{Im}z$.

P.76

2. With the aid of the theorem in Sec. 21. show that each of these functions is nowhere analytic:

(a) $f(z) = xy + iy$; (b) $f(z) = 2xy + i(x^2 - y^2)$ (c) $f(z) = e^ye^{ix}$.