2016/17 MATH2230B/C Complex Variables with Applications
Problems in HW 2
Due Date on 9 Feb 2017

All the problems are from the textbook, Complex Variables and Application ($9th$ edition).

1 P.71

3. Form results obtain 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) $f(z) = z\mathrm{Im}(z)$.

4. Use the theorem in Sec. 24 to show that each of these functions is differentiable in the indicated domain of definition, and also to find $f'(z)$:

   (a) $f(z) = 1/z^4$ $(z \neq 0)$;

   (b) $f(z) = e^{-\theta}\cos(\log r) + ie^{-\theta}\sin(\log r)$ $(r > 0, 0 < \theta < 2\pi)$.

2 P.85

5. Show that if the condition that $f(x)$ is real in the reflection principle (Sec. 29) is replaced by the condition that $f(x)$ is pure imaginary, then equation (1) in the statement of the principle is changed to

$$\overline{f(z)} = -f(\overline{z}).$$