

MATH 508 Challenge problem set #4

Turn in no later than Mar. 15 for credit

Use the chain rule for functions of two variables and the polar form of the Cauchy–Riemann equations (section 2.4, exercise 6) to show that if $f = u + iv$, then at any point of analyticity $z = e^{i\theta}$ one has

$$f'(z) = e^{-i\theta}(u_r + iv_r) = -\frac{i}{z}(u_\theta + iv_\theta).$$