



COMPLEX VARIABLES  
SPRING 2011

ASSIGNMENT 3.3  
DUE SEPTEMBER 19

**Exercise 1.** Let  $\log w$  denote the branch of the logarithm with  $\arg w \in (0, 2\pi]$  and let  $w^{1/2} = e^{\frac{1}{2} \log w}$ . Where is  $(z^2 + 4)^{1/2}$  continuous? What about  $(z^2 - 1)^{1/2}$ ?

**Exercise 2.** Show that  $f(z) = |z|^2$  is differentiable only at  $z_0 = 0$ . [*Suggestion:* For  $z_0 \neq 0$ , use the fact that  $g(z) = z$  is differentiable but that  $h(z) = \bar{z}$  is *not*.]

**Exercise 3.** 1.5.7