

Assignment #4

Due Wednesday, 24 February 2016, at the start of class

Please read Sections II.2–II.7 in Gamelin. I will not assign problems from II.4. There will be problems from II.7 on the next Assignment.

Do the following Exercises. The circled Exercises are the ones I will grade, and they are the ones for which I will write complete solutions.

Section II.2, page(s) 46, Exercises:

- ④ (Please interpret “differentiating $f(z)$ by hand” as “use limit (2.2) or (2.4) to compute the derivative. You cannot just use the rule for differentiating z^m .”)
- 5

Section II.3, page(s) 50, Exercises:

- ④
- 5
- ⑥
- 7

Section II.5, page(s) 57–58, Exercises:

- ① (a) (c) (f)
- 1 (b) (d) (e)
- ②
- ④ (If $h(z) = u + iv$ and $z = x + iy$ then you know equations for u and v . Algebraic steps then show that u and v solve the Cauchy-Riemann equations.)
(You may have seen this formula in another reference. Nonetheless, derive it.)
- 5 Start with the formulas $x = r \cos \theta$, $y = r \sin \theta$ and derive the polar form from the cartesian form $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.)

Section II.6, page(s) , Exercises:

- ① (a) (c)
- 3
- ④