Homework 2 (due 2/14)

MAT 342: Applied Complex Analysis

Read Section 12 from Chapter 1 and Sections 13–20 from Chapter 2.

Problems from the textbook:

§11: 1, 2
§12: 1(a)–(e), 2(a)–(e), 3(a)–(e)
§14: 1(b)–(c), 5, 7
§18: 3(b), 5, 10

Additional problems to hand in:

Problem 1. Find the roots of the equation $z^4 + 1 = 0$ and then use them to factor the polynomial $z^4 + 1$. Using the factorization, determine whether the limit

$$\lim_{z \to e^{i\pi/4}} \frac{z^2 - i}{z^4 + 1}$$

exists. In this case, find the limit.

Problem 2. Find the image of the vertical line $\mathrm{Re}(z) = 1$ under each of the following functions:

(i) $f(z) = z - 1 - i$

(ii) $g(z) = i(z - 1 - i) = e^{i\pi/2} f(z)$