APPM 5430 Complex Variables and Applications

HOMEWORK #1   Assigned Mon Aug. 26, 2019

DUE AT CLASS WEDNESDAY Sept. 11, 2019

Chapter 1

1.1

a) Solve $z^3 + 1 + i = 0$

b) Establish: $|z_1\bar{z}_2 - 2\bar{z}_1 z_2 + \bar{z}_1\bar{z}_2| \leq 4|z_1 z_2|$

1.2   6, 8

1.3   2, 5, 12

Chapter 2

2.1   2b, 7

2.2   1d, 9a-c

2.3   2b

2.3 Additional problem:

Find a branch cut for the function $(z^2 + a^2)^{1/2} = \sqrt{r_1 r_2}\, e^{i(\theta_1 + \theta_2)/2}, a > 0$ where $r_1 = |z + ia|$, $r_2 = |z - ia|$ using as principal angles:

a) both $\theta_{1,2}$ are between $3\pi/2$ and $-\pi/2$

and

b) θ_1 between $3\pi/2$ and $-\pi/2$ and θ_2 between $\pi/2$ and $-3\pi/2$.