AMATH 567: Applied Complex Variables. Autumn 2020
Homework Assignment #1
Due: Wednesday, October 14, 2020
Please upload to Canvas by midnight

1. From AF: 1.1.1: b-d. Problems copied below:

Express each of the following in polar exponential form:

(b) –i

(c) 1+i

(d) $\frac{1}{2}+\frac{\sqrt{3}}{2}i$

2. From AF: 1.1.2. Problems copied below:

Express each of the following in the form of a+bi, where a and b are real.

(a) $e^{2+i\ /2}$

(b) $\frac{1}{1+i}$

(c) $(1+i)^3$

(d) $\left|3+4i\right|$

(e) $\cos(i\ \ /4+c)$, where c is real.

3. AF 1.1.3: a,b

Solve for the roots of the following equation:

(a) $z^3=4$

(b) $z^4=-1$

4. AF 1.1.4: a,d,e,f

Establish the following result:

(a)(z+w)*=z*+w*

(d) $\mathrm{Re}\,z\le\left|z\right|$

(e) $\left|wz^*+w^*z\right|\le 2\left|wz\right|$

5. Prove the triangle inequality

$$\left|\sum_{j=1}^{N} z_j\right|\le\sum_{j=1}^{N}\left|z_j\right|$$

What is the condition for equality?