

## MATH 417 HOMEWORK 1

You may collaborate on the homework. However, the final write-up must be yours and should reflect your own understanding of the problem. Please be sure to properly cite any help you get.

**Problem 1** Calculate the following:

- (1)  $(\sqrt{3} - i)^{10}$
- (2)  $(1 + i)^{-20}$

**Problem 2** Show that  $\sqrt{2}|z| \geq |Re(z)| + |Im(z)|$ .

**Problem 3** Draw the following curves in the complex plane

- (1)  $2z + 2\bar{z} = 5$ .
- (2)  $|z - 1 + i| = 4$ .

**Problem 4** Find all the solutions of the following equations

- (1)  $z^3 = (1 - i)$
- (2)  $z^7 = (\sqrt{3} + i)$

**Problem 5** Show that if  $|a| < 1$  and  $|b| < 1$ , then

$$\frac{|a - b|}{|1 - \bar{a}b|} < 1.$$