MATH 417 HOMEWORK 1

This homework is due Wednesday September 3 in the beginning of class. 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) $2z + 2\overline{z} = 5$.
(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

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