Math 1B: Discussion 4/18/19

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Question 1: "Simple" Complex Arithmetic

Simplify the following.

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

Question 2: Polar Form

Write the following complex numbers in polar form.

$$4-4i \qquad -3-3\sqrt{3}i \qquad -\sqrt{3}+i$$

Write the following complex numbers in Cartesian form.

$$2\left(\cos\left(\frac{7\pi}{6}\right)+i\,\sin\left(\frac{7\pi}{6}\right)\right)$$
$$3\sqrt{2}\left(\cos\left(\frac{7\pi}{4}\right)+i\,\sin\left(\frac{7\pi}{4}\right)\right)$$

Question 3

Write all of the complex numbers in Question 2 in terms of e.

Question 4: DeMoivre's Theorem

Find the following quantities

$$(1-\sqrt{3}i)^{40} \qquad \left(\frac{-1-\sqrt{3}i}{\sqrt{2}+\sqrt{2}i}\right)^{100}$$

Question 5

Show that

$$\sin(\theta)=\frac{e^{i\theta}-e^{-i\theta}}{2i} \quad \text{and} \quad \cos(\theta)=\frac{e^{i\theta}+e^{-i\theta}}{2}$$