

Homework 2

1. Calculate using polar forms

$$a) \frac{(1+i)(1-\sqrt{3}i)^2}{(-3+3i)(2-2i)^5} \quad b) \left(\frac{-\sqrt{3}+i}{1-\sqrt{3}i} \right)^{40}$$

2. In each part find all the roots and sketch them as vectors in the complex plane.

$$a) \sqrt[3]{-i} \quad b) \sqrt[6]{1} \quad c) \sqrt[4]{-8+8\sqrt{3}i}$$

3. Find

$$a) \left(1 - \frac{\sqrt{3}-i}{2} \right)^{24} \quad b) \sqrt[3]{\frac{2-i}{1+2i}}$$
$$c) \sqrt[3]{\frac{(2\sqrt{2}+i2\sqrt{2})^2}{\sqrt{2}-i\sqrt{2}}} \quad d) \sqrt[4]{1+5i-\frac{6}{1-i}}$$

4. Write the deMoivre's formula for $n = 3$ and use this to obtain trigonometric identities for $\cos 3\varphi$ and $\sin 3\varphi$.