# MA2287: Complex Analysis Exam Notes

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# 1 Question 1:

## 1.1 Sketch the region in the complex plane determined by the inequality

- $|z-4| > 3|z+4|$ (2023 (1.a))
- $\{z \in \mathbb{C} : |2z-1| < 2|2z-i|\}$ (2022 (1.a))

## 1.2 Determine all solutions to roots of unity

- $z^6 - 1 = 0$ and factorize $x^6 - 1$ as a product of linear and quadratic factors (2023 (1.b))

## 1.3 Determine and sketch the image under the mapping

- $w = e^z$, $\{z \in \mathbb{C} : \pi/4 \leq \mathrm{Im}(z) \leq \pi/2\}$ (2023 (1.c))

## 1.4 Find z where the function is 0

- $\cos(z) = \frac{e^{iz}+e^{-iz}}{2}$ (2023 (1.d))

## 1.5 Calculate principal value Log(z)

## 1.6 Prove the following