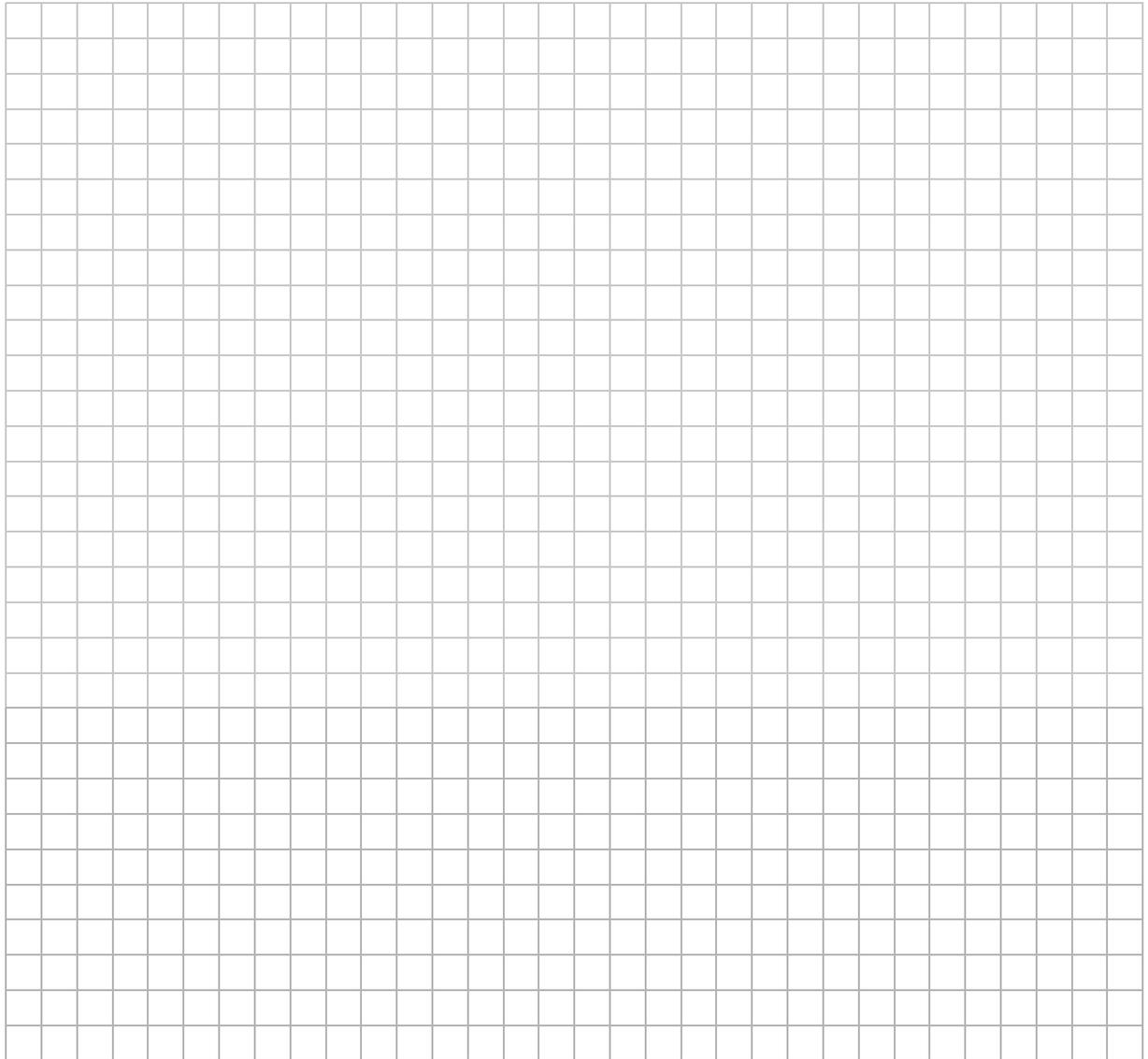


Question 4

(25 marks)

(a) Prove, using induction, that if n is a positive integer then

$$(\cos \theta + i \sin \theta)^n = \cos(n\theta) + i \sin(n\theta), \text{ where } i^2 = -1.$$



(b) Hence, or otherwise, find $\left(-\frac{1}{2} + \frac{\sqrt{3}}{2}i\right)^3$ in its simplest form.

