Question 4 LCH - 2018 - Paper 1 **(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.