

4. (a) Use de Moivre's theorem to prove that

$$\sin 7\theta = 7 \sin \theta - 56 \sin^3 \theta + 112 \sin^5 \theta - 64 \sin^7 \theta \quad (5)$$

(b) Hence find the distinct roots of the equation

$$1 + 7x - 56x^3 + 112x^5 - 64x^7 = 0 \quad (5)$$

giving your answer to 3 decimal places where appropriate.