



QUESTION WORKBOOK

De Moivre's theorem and trigonometric identities

Complex numbers · Year FM

6 questions · 20 marks

PRINT EDITION

SECTION A · Warm-up

- A1** State De Moivre's theorem, and explain why a number must be in modulus-argument form before the theorem can be applied. [2]

- A2** Use De Moivre's theorem to evaluate $(1 - i)^6$. [3]

SECTION B · Standard

- B1** Evaluate $(\sqrt{3} + i)^5$, giving the answer in the form $a + bi$ with exact values. [4]

- B2** Write down the value of $(\cos \pi/12 + i \sin \pi/12)^6$. [3]

- B3** By expanding $(\cos \theta + i \sin \theta)^3$ and equating imaginary parts, show that $\sin 3\theta = 3 \sin \theta - 4 \sin^3 \theta$. [4]

SECTION C · Stretch

- C1** Show that $\cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1$. [4]