



QUESTION WORKBOOK

Roots of unity and complex roots

Complex numbers · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State how many solutions $z^5 = 32$ has over the complex numbers, and give the modulus of each. [2]

A2 List the arguments of the sixth roots of unity, describe the shape they make on an Argand diagram, and state their sum. [3]

SECTION B · Standard

B1 Solve $z^3 = -27$, giving all roots exactly. [4]

- B2** Solve $z^4 = -16$, giving all roots in the form $a + bi$ with exact values, and describe their arrangement. [4]

- B3** By considering the factorisation of $z^5 - 1$, show that the five fifth roots of unity sum to zero. [3]

SECTION C · Stretch

- C1** Solve $z^3 = 64i$, giving all roots exactly. [4]