1.12 Core Pure: Complex Numbers Depth: 10-minute Pack

Total Marks

EDEXCEL 9FM0 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The cubic equation $z^3 + pz^2 + qz - 26 = 0$, where p and q are real constants, has a root $-3 + 2i$.

(a) Write down another complex root of the equation, with a reason. **(2)**

(b) Find the third root of the equation. **(3)**

(c) Find the values of p and q. **(4)**

(Total for Question 1 is 9 marks)

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Question 1

(a) -3 - 2i **B1**

(a) complex roots of a polynomial with real coefficients occur in conjugate pairs **B1**

(a) Answer: -3 - 2i

(b) uses the product of the roots: $(\alpha)(\alpha^*)(r) = -(-26)$ **M1**

(b) $((-3)^2 + 2^2)\ r = 26$ **A1**

(b) r = 2 **A1**

(b) Answer: 2

(c) uses sum of roots = -p **M1**

(c) p = 4 **A1**

(c) uses the sum of products of pairs = q **M1**

(c) q = 1 **A1**

(c) Answer: p = 4, q = 1

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