

爱德思

Further Pure Mathematics 1

分类真题

2014-2022 册

A Level Clouds 出品

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# **Chapter 1**

Complex Numbers

4.

$$f(x) = x^4 + 3x^3 - 5x^2 - 19x - 60$$

- (a) Given that  $x = -4$  and  $x = 3$  are roots of the equation  $f(x) = 0$ , use algebra to solve  $f(x) = 0$  completely. (7)

- (b) Show the four roots of  $f(x) = 0$  on a single Argand diagram. (2)

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7. (i) Given that

$$\frac{2w - 3}{10} = \frac{4 + 7i}{4 - 3i}$$

find  $w$ , giving your answer in the form  $a + bi$ , where  $a$  and  $b$  are real constants.  
You must show your working.

(4)

- (ii) Given that

$$z = (2 + \lambda i)(5 + i)$$

where  $\lambda$  is a real constant, and that

$$\arg z = \frac{\pi}{4}$$

find the value of  $\lambda$ .

(4)

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2. Given that  $-2 + 3i$  is a root of the equation

$$z^2 + pz + q = 0$$

where  $p$  and  $q$  are real constants,

- (a) write down the other root of the equation. (1)
- (b) Find the value of  $p$  and the value of  $q$ . (3)

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5. Given that  $z_1 = -3 - 4i$  and  $z_2 = 4 - 3i$

(a) show, on an Argand diagram, the point  $P$  representing  $z_1$  and the point  $Q$  representing  $z_2$

(2)

(b) Given that  $O$  is the origin, show that  $OP$  is perpendicular to  $OQ$ .

(2)

(c) Show the point  $R$  on your diagram, where  $R$  represents  $z_1 + z_2$

(1)

(d) Prove that  $OPRQ$  is a square.

(2)

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1.

$$f(x) = x^4 - x^3 - 9x^2 + 29x - 60$$

Given that  $x = 1 + 2i$  is a root of the equation  $f(x) = 0$ , use algebra to find the three other roots of the equation  $f(x) = 0$

(7)

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