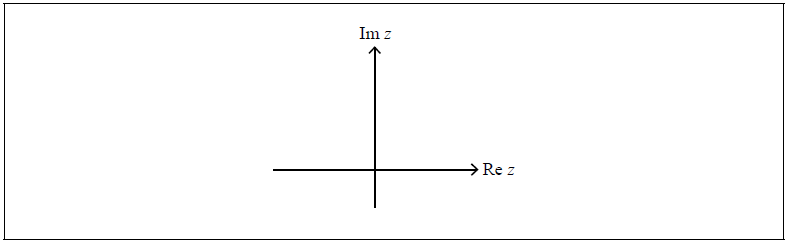
# 1.13 Polar and Euler form\_P\_1

**1a.** *[1 mark]*

Let , ,  and let .

Show the points represented by  and  on the following Argand diagram.

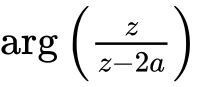


**1b.** *[1 mark]*

Find an expression in terms of *θ* for .

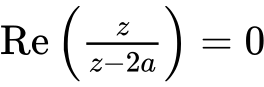


**1c.** *[2 marks]*

Find an expression in terms of *θ* for .



**1d.** *[3 marks]*

Hence or otherwise find the value of *θ* for which .



**2a.** *[4 marks]*

Find the roots of the equation , . Give your answers in Cartesian form.



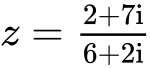
**2b.** *[3 marks]*

One of the roots  satisfies the condition .

Given that , express  in the form , where , .



**3a.** *[2 marks]*

Consider the complex number .

Express  in the form , where .



**3b.** *[2 marks]*

Find the exact value of the modulus of .



**3c.** *[2 marks]*

Find the argument of , giving your answer to 4 decimal places.



**4a.** *[7 marks]*

Consider .

Use mathematical induction to prove that .

**4b.** *[4 marks]*

Given  and ,

(i)     express  and  in modulus-argument form;

(ii)     hence find .

**4c.** *[1 mark]*

The complex numbers and  are represented by point A and point B respectively on an Argand diagram.

Plot point A and point B on the Argand diagram.

**4d.** *[3 marks]*

Point A is rotated through  in the anticlockwise direction about the origin O to become point . Point B is rotated through  in the clockwise direction about O to become point .

Find the area of triangle O.

**4e.** *[5 marks]*

Given that  and  are roots of the equation , where ,

find the values of  and .

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