



PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE

Examination Answer Books

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- Please give the information requested above and enter your name in the space provided at the top right of this page. If your answers are to be marked under a scheme whereby the examiners will not know your identity, fold over and seal down the top right-hand corner of the page (using the gummed label provided) in order to conceal your name.
- Commence each answer on a fresh page.
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 - be numbered consecutively;
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Summary of Marks

Question Numbers Answered	1st Examiner	2nd Examiner (optional)	3rd Examiner (optional)
1	5		
2	2		
	7		
TOTAL			
RESULT			

Question No.		Examiner Only
①		
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Question 1

(A)

i) solve $x^2 - 12x + 37 = 0$

$$0 = x^2 - 12x + 37$$

B

$$i) \frac{P}{2} + \frac{Q}{2} = \frac{-4+8j}{2} + \frac{2+6j}{2} = \frac{2j}{2} + \frac{4j}{2} = \frac{6j}{2} = 3j \quad \times$$

$$ii) (P+R)(P-R)$$

$$(P+R) \quad (-4+8j + -1-3j) = (-5+5j)$$

$$P-R \quad (-4+8j - (-1-3j)) = (-3+11j) \quad \checkmark$$

 $1\frac{1}{2}$

$$\begin{aligned} (P+R)(P-R) &= (-5+5j)(-3+11j) = (15+55j-15j-55j^2) \\ &= (15+55j-15j-55j^2) \\ &= (15+55j-15j+55) \quad \text{Answer} = (70+40j) \quad \times \end{aligned}$$

$$iii) \quad P^2 + Q^2 + R^2 = (-4+8j)(-4+8j) + (2+6j)(2+6j) + (-1-3j)(-1-3j)$$

$$P^2 = (-4+8j)(-4+8j) = (16-32j-32j+64j^2) \quad \checkmark$$

$$Q^2 = (2+6j)(2+6j) = (4+12j+12j+36j^2) \quad \checkmark$$

$$R^2 = (-1-3j)(-1-3j) = (1+3j+3j+9j^2) \quad \checkmark$$

$$\begin{array}{ccccccc} 16 & -32j & -32j & +64j^2 & +4 & +12j & +12j & +36j^2 & +1 & +3j & +3j & +9j^2 \\ \hline & & & -64 & & & & 36 & & & & -9 \\ \hline & & & (-53) & & & & (36j) & & & & \end{array}$$

$$\text{Answer} = (-53+36j) \quad \times$$

$$iv) \quad \frac{Q}{R} = \frac{2+6j}{-1-3j} = -2j \quad \times$$

$$v) \frac{2p-3r}{4q+p} =$$

$$2p = 2(-4+8j) = -8+16j \quad 2p-3r = (-8+16j) - (3-9j)$$

$$3r = 3(-1-3j) = -3-9j$$

$$4q + p =$$

$$4q = 4(2+6j) = (8+24j)$$

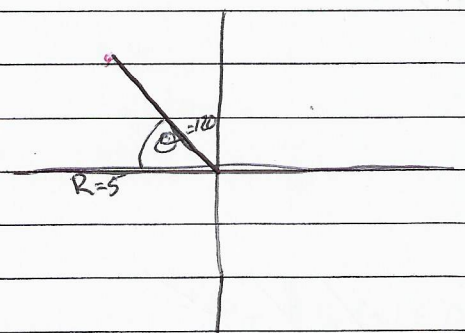
$$p = (-4+8j)$$

$$\frac{(-8+16j) - (-3-9j)}{(8+24j) + (-4+8j)} = \frac{(-5+25j)}{(4+32j)}$$

1 1/2

c) i) ^{Root}
 $R = \text{Modulus of argand diagram } (r = |z| = \sqrt{a^2+b^2})$
 $\theta = \text{Argument or the area being measured}$

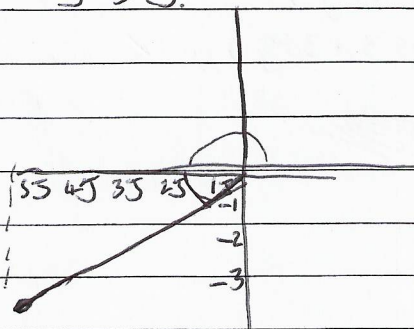
$$ii) r=5 \text{ and } \theta=120$$



labelling?

1

$$iii) -3-5j$$



$$\tan^{-1} \theta = \frac{3}{5}$$

$$\theta = \tan^{-1}$$

$$\theta = 30.96$$

$$360 - 30.96 = 329.04^\circ$$

$$\angle 329.04^\circ$$

d) Expand $(2+5)^3$

5

Question No.

Examiner Only

Question 2

2c.

i) $PQ = \text{NoT Possible}$

$$\text{ii) } P2 = \begin{pmatrix} -1 & -1 \\ -3 & -3 \\ -5 & -5 \end{pmatrix} =$$

$3 \times 0 \quad 3 \times 0$

$$\text{iii) } Q2 = \begin{pmatrix} 3 & -2 \\ 5 & -4 \end{pmatrix} \begin{pmatrix} 3 & -2 \\ 5 & -4 \end{pmatrix} =$$

$2 \times 3 \quad 2 \times 3$

$$\text{iv) } R2^2 = \begin{pmatrix} 2 & -1 & 6 \\ 0 & 3 & 0 \\ 5 & -1 & -3 \end{pmatrix} \begin{pmatrix} 2 & -1 & 6 \\ 0 & 3 & 0 \\ 5 & -1 & -3 \end{pmatrix}$$

$3 \times 3 \quad 3 \times 3$

v) $RR = \text{Not possible}$

R

$$\text{vi) } RP = \begin{pmatrix} 2 & -1 & 6 \\ 0 & 3 & 0 \\ 5 & -1 & -3 \end{pmatrix} \begin{pmatrix} -1 \\ -3 \\ -5 \end{pmatrix}$$

$3 \times 3 \quad 3 \times 0$

vii) PT

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