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SWANSEA - ABERTAWE

Examination Answer Books

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- Commence each answer on a fresh page.
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 - be numbered consecutively;
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- Your answers must be legibly written **IN INK**.
The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.

Summary of Marks

Question Numbers Answered	1st Examiner	2nd Examiner (optional)	3rd Examiner (optional)
2	8 1/2		
3	10		
	18 1/2		
TOTAL			
RESULT			

Q2

a)

$$i) 4 - q^2$$

$$(\cancel{q+2})(\cancel{q+2})$$

$$ii) 3ab + 4cd - cb - 12ad$$

$$\begin{pmatrix} 12 & 1 \\ 6 & 2 \\ 4 & 3 \end{pmatrix}$$

$$(\cancel{16ab+1cd})(\cancel{2ab-})$$

$$(a+b)(3a-c)$$

$$iii) p^2 - 2p - 63$$

$$\begin{pmatrix} 63 & 1 \\ 9 & 7 \\ 3 & 21 \end{pmatrix}$$

$$(p+63)(p+1)$$

$$iv) q^2 - 4qr$$

$$(\cancel{q+2qr})(\cancel{q+2qr})$$

$$(q+1qr)(q+4qr)$$

①

②

$$B) (2x-1)(3x+5) = (6x-5)(x-9)$$

$$i) ① 6x + 10x - 3x - 5 = 6x^2 - 54x - 5x + 45 \quad ②$$

$$③ = ② \times 2$$

$$= 12x^2 - 108 - 10x + 8 \rightarrow 12x^2 - 108 + 8$$

+

$$6x - 3x - 5$$

$$6x + 10x - 3x - 5$$

$$12x^2 - 108 + 8 = 6x - 3x - 5 - 12x^2$$

$$+ 5 - 108 + 8 = 6x - 3x - 12x^2$$

B

i) $5 - 108 + 8 = 6x - 3x - 12x^2$
 Continued $\div 3$

ii) $\frac{x-4}{5} = \frac{2x-1}{3}$

$3(x-4) = 5(2x-1)$

$3x - 12 = 10x - 5$

$-2 = 10x - 5 - 3x$

$-2 + 5 = 10x - 3x$

$3 = 7x$

$x = 2.30$

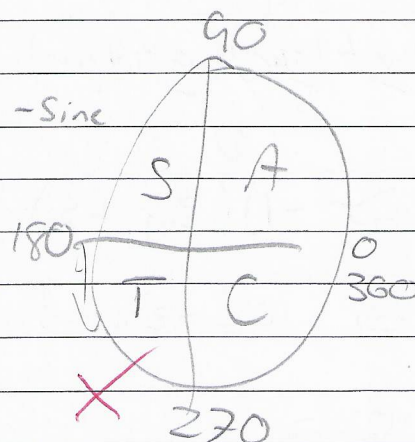
Di

$\tan + \cos = -\sin$

i) $4 \sin x = -3$

$4 \sin(-2) = -0.2093$

$4 \sin^{-1}$



Dii)

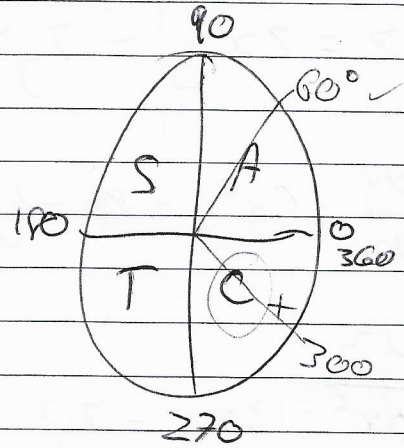
$$\cos x = -0.5$$

$$\cos^{-1}(-0.5)$$

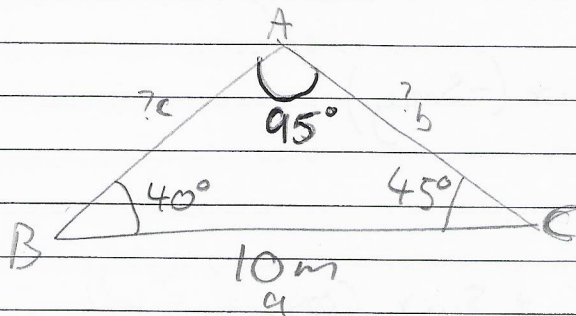
$$= 120$$

$$180 - 120 = 60^\circ$$

$$180 + 120 = 300^\circ$$



C)



Cosine rule

$$a^2 = b^2 + c^2 - 2bc \cos(A)$$

$$100 = b^2 + c^2 - 2bc \cos$$

Ei)

$$y = x^3 e^{2x}$$

$$\frac{dy}{dx} = x^3 (2e^{2x}) + e^{2x} (3x^2)$$

$$u = x^3$$

$$v = e^{2x}$$

$$\frac{dv}{dx} = 2e^{2x}$$

$$\frac{du}{dx} = 3x^2$$

Eii)

$$y = \sin 5x \cos 3x \quad \frac{dy}{dx} = \sin 5x (-3 \cos 3x) + 5x \cos 3x (\cos 5x)$$

$$\frac{du}{dx} = \cos$$

$$dv = 5 - 3 \sin x$$

$$\frac{dv}{dx}$$

2

$$F) z = 2x^3y - 7y^3x + \sin x \cos y$$

$$\frac{dy}{dx} = 6x^2y - 7y^3 + \cos x \cos y$$

1 1/2

$$\frac{d^2y}{dx^2} = 12xy - 7y^3 + \cos y (-\sin x) \quad 1^{st}$$

1

$$\frac{dx}{dy} = 2x^3 - 21y^2x + \sin x (-\sin y)$$

1 1/2

$$\frac{d^2x}{dy^2} = 6x^2 - 42xy + \sin x \cos y \quad 2^{nd}$$

1/2

$$\frac{\partial^2 z}{\partial y^2} =$$

8 1/2

Q3

$$a) 7x + 4y = 46 \quad (1)$$

$$8x + 6y = 57 \quad (2)$$

$$(1) \times (2) = (2) \times (1)$$

~~84x~~

~~$$21x + 12y = 138 \quad (3)$$~~

~~$$8x + 6y = 57 \quad (2)$$~~

~~$$21x + 18y = 171 \quad (3)$$~~

$$21x + 12y = 138 \quad (3)$$

$$8x + 6y = 57 \quad (2)$$

$$21x + 18y = 195$$

$$21x = 195 - 18y$$

$$B) 3x^2 + 5x - 2 = 0$$

$$a = 3$$

$$b = 5$$

$$c = -2$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(3 \times -2)}}{6}$$

$$= \frac{-5 \pm \sqrt{5^2 - 24}}{6}$$

$$= \frac{-5 \pm \sqrt{49}}{6}$$

$$= \frac{-5 \pm 7}{6}$$

$$+ = 7.3$$

$$- = -9$$

$$-4 \times -6$$

$$= -24$$

$$-6$$

2

c) $x^2 + 11x + 30 = 0$

i)

$$(x+1)(x+10)$$

$$x-1=0$$

$$x-10=0$$

$$\begin{array}{|c|c|} \hline 30 & 1 \\ \hline 3 & 10 \\ \hline \end{array}$$

X

ii) $x^2 - 11x = 0$

$$11 \cdot 1$$

$$(x+1)(x+11)$$

$$x+1=0$$

iii) $x+11=0$

X

iii) $x^2 - 4 = 0$

$$(x+2)(x+2)$$

X

$$xxxxxx \times xxxxxx$$

$$6x \times 6x$$

$$x \times x \times x$$

d)

i) $y = 6x^2(x^3 - 2x^2 + 5x - 1)$

$$= 12x(3x^2 - 4x + 5)$$

X

dii) $y = \frac{7}{x^2} - \frac{4}{x} + 8$

iii) $y = \frac{\sin x}{\cos x}$

E)

$$i) y = (2x^2 - 5x + 1)^7$$

$$\frac{dy}{dx} = 7(2x^2 - 5x + 1)^6 \times (4x - 5)$$

$$4x - 5$$

2

$$ii) e^{x^2+4}$$

$$\frac{dy}{dx} = 4(e^{x^2+4}) \times (2x)$$

X

$$iii) \cos^3 2x$$

$$\frac{dy}{dx} = 3(\cos^2 2x)(-2\sin 2x)$$

1

$$F) \quad a = 4.5 \text{ cm} \quad b = 8.8 \text{ cm} \quad c = 12.5 \text{ cm}$$

$$s = \frac{a+b+c}{2}$$

$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$4.5$$

$$8.8$$

$$12.5$$

$$25.8$$

$$\frac{25.8}{2} = s = 12.9$$

$$\sqrt{12.9(12.9-4.5)(12.9-8.8)(12.9-12.5)}$$

$$= 13.330 \text{ cm}^2$$

5

10

Question No.

Examiner Only

Question No.

Examiner On

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