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

Examination Answer Books

91%

Complete, fold and seal
(see note 1 below)

SURNAME: Martin

FORENAME(S): Joshua

Candidate's Exam Number: _____

Book No. | **Total Books Handed In:**

Programme Title: _____

Year/Level/Stage: _____

Examination Paper Title: _____

Examination Paper Ref No.: _____ **Desk Letter/Number:** _____

Date: ___ / ___ / 20___ **Time:** _____ **am/pm** **Room Name or No.:** _____

Instructions to Candidates:

1. 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.
2. Commence each answer on a fresh page.
3. Do all rough work in the answer book and cross through it.
4. No part of this booklet is to be torn out.
5. Supplementary answer books if used must:-
 (a) bear the candidate's name (concealed, where appropriate), reference number and paper title;
 (b) be numbered consecutively;
 (c) be fastened together by the tags available from the invigilator.
6. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the exam room.
7. Your anwers 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	33·5		
3	39		
	72·5		
TOTAL			
RESULT			

Question No. | Examiner Only

2a. i $(q-2)(q+2)$ ✓ — 1

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

$= 3a(b - 4d) + c(4d - b)$ ✓ — 2

iii $p^2 - 2p - 63$

$= (p-9)(p+7)$ ✓ — 3

iv. $q^2 - 4qr$

$= q(q-4r)$ ✓ — 1

b.i $(2x-1)(3x+5) = (6x-5)(x-9)$

$= 6x^2 + 10x - 3x - 5 = 6x^2 - 54x - 5x + 45$ ✓ — 2

$10x - 3x + 54x + 5x = 54 + 5$

$66x = 59$

$x = \frac{59}{66}$

$x = 0.89$

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

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

$= 3x - 12 = 10x - 5$

$-7 = 7x$

$x = \frac{-7}{7}$ ✓ — 4

$x = -1.00$

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Question No.

Examiner On

$$\frac{dx}{dy} = \sin 5x(-3\sin 3x) + \cos 3x(5\cos 5x)$$ ✓ $\frac{1}{2}$

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

$\frac{\partial z}{\partial x} = 6x^2y - 7y^3 + \cos x \cos y$ ✓ 1st x

$\frac{\partial^2 z}{\partial x^2} = 12xy - \sin x \cos y$ ✓ 2nd x (1)

$\frac{\partial^2 z}{\partial y^2} = 6x^2 - 21y^2 + \cos x(-\sin y)$ xy (2)

$\frac{\partial z}{\partial y} = 2x^3 - 21y^2x + \sin x(-\sin y)$ ✓ 1st y

$\frac{d^2z}{dy^2} = -42yx + \sin x(-\cos y)$ 2nd y (3)

$\frac{d^2z}{dx^2} = 6x^2 - 21y^2 + \cos x(-\sin y)$ ✓ yx (4) 7

$33\frac{1}{2}$

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Question No.

Examiner Only

3a. $7x + 4y = 46$ (1) $\times 6$

$8x + 6y = 57$ (2) $\times 4$

$42x + 24y = 276$ (3)

$32x + 24y = 228$ (4)

(3) − (4) $= 10x = 48$

$x = \frac{48}{10}$

$x = 4.8$ ∴ 1 sig fig $\boxed{x = 5}$ ✓

Sub x into (1)

$7(4.8) + 4y = 46$

$4y = 12.4$

$y = \frac{12.4}{4}$

$y = 3.1$ ∴ 1 sig fig $\boxed{y = 3}$ ✓

check in (2)

$8(4.8) + 6(3.1) = 57$

$57 = 57$ ✓

6

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Question No.

Examiner Only

3b. $3x^2+5x-2=0$

$$\frac{-5\pm\sqrt{5^2-4(3)(-2)}}{2(3)}$$

$$=\frac{-5\pm\sqrt{25+24}}{6}$$

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

~~$\frac{5\pm\sqrt{49}}{6}$~~ $\frac{-5\pm7}{6}$

~~$x=0.33$~~

$x=0.33$
$x=-2.00$

5

C. i $x^2+11x+30=0$

$(x+5)(x+6)=0$ ∴ $x+5=0$ $x=-5$
$x+6=0$ $x=-6$

$x=-5$
$x=-6$

3

ii $x^2-11x=0$

$x(x-11)$ ∴ $x-11=0$ $x=11$
$x=0$

$x=11$
$x=0$

3

iii $x^2-4=0$

$(x-2)(x+2)$ $x-2=0$ $x=2$
$x+2=0$ $x=-2$

$x=2$
$x=-2$

3

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Question No.

Examiner Or

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

$= 6x^5 - 12x^4 + 30x^3 - 6x^2$

$\frac{dy}{dx} = 30x^4 - 48x^3 + 90x^2 - 12x$ ✓ 3

~~$30x^2(x^2$~~

$= 10x^2(3x^2 + 9) - 12x(4x^2 + 1)$

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

$= 7x^{-2} - 4x^{-1} + 8$

$\frac{dy}{dx} = -14x^{-3} + 4x^{-2}$

$= \frac{-14}{x^3} + \frac{4}{x^2}$ ✓ 4

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

$y = \tan x$

$\frac{dy}{dx} = \sec^2 x$ ✓ 2

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Question No.

Examiner Only

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

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

Stop here

2

$=(28x^2-35x+7)(4x-5)$

$=112x^3-140x^2+28x-140x^2+175x-35$

$=112x^3-280x^2+203x-35$

Check:

$u=2x^2-5x+1$

$\frac{dy}{du}=7u^6$ $\quad \frac{du}{dx}=4x-5$

$\frac{dy}{dx}=7u^6 \times 4x-5$

$=7(2x^2-5x+1)^6 \cdot 4x-5$

ii e^{x^2+4}

$u=e$

$\frac{dy}{du}=1$ $\quad \frac{du}{dx}=2x$

0

? Come back later *

$\frac{dy}{dx}=2x$

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Question No.

Examiner Only

e^{x^2+4}

$u = e$

$\frac{dy}{du} = 2x(u)$

$u = x^2 + 4$

$\frac{dy}{du} =$

e^{x^2+4}

$x^2 + 4 = \log_e y$

$\frac{du}{dx}$

e iii $\cos^3 2x = (\cos 2x)^3$

$u = \cos 2x$

$\frac{dy}{du} = 3u^2$ $\quad\quad$ $\frac{du}{dx} = -2\sin 2x$

$\frac{dy}{dx} = 3u^2 \times -2\sin 2x$

$= 3(\cos 2x)^2 \cdot -2\sin 2x$ ✓

3

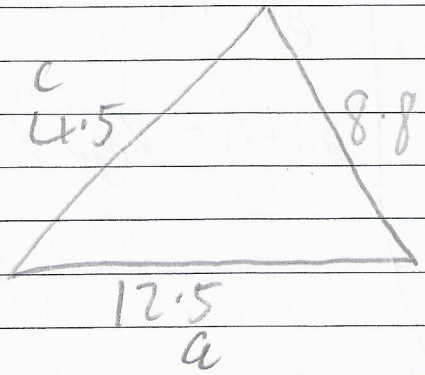
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Question No.

Examiner On



$S = \frac{a+b+c}{2}$ $\therefore S = \frac{12.5+8.8+4.5}{2}$

$S = 12.9$

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

$= \sqrt{12.9(0.4)(4.1)(8.4)}$

$= \sqrt{12.9(13.776)}$

$= \sqrt{177.71}$

$Area = 13.33\ cm^2$

5

39

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