



CYFENW: Richard

ENW(AU) CYNTAF: Caitlyn

Llyfr Atebion Arholiadau

12 Tudalen

Cyfarwyddiadau i Ymgeiswyr

1. Rhowch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhowch eich enw yn y lle a ddarparwyd ar y dde, plygwch ef a'i selio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.
3. Rhaid i'r atebion fod mewn llawysgrifen ddarllenadwy. Gall yr Arholwyr naill ai anwybyddu sgrïpt annarllenadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
4. Ysgrifennwch eich atebion mewn inc.
5. Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnu llinell drwyddynt.
6. Ni ddylid rhwygo unrhyw ran o'r llyfr hwn; rhaid ei gyflwyno yn gyfan.
7. Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwylwr/gwylwyr.
8. Rhaid dychwelyd pob llyfr. Ni chaniateir mynd â llyfrau atebion, wedi eu defnyddio neu heb eu defnyddio, allan o'r lleoliad arholi o dan unrhyw amgylchiadau.

1	Rhif Myfyriwr	R1C22869222
2	Teitl y Papur Arholiad	HNC electrical engineering (uwtsd) Mathematics test 1
3	Cod y Modwl	GOEN4001
4	Dyddiad ac Amser yr Archoliad	23/1/23 13:30
5	Lleoliad yr Arholiad	ward 2 Gower college
6	Rhif Sedd	7
7	Nifer y Llyfrau Atebion a gyflwynwyd	

Rhestrwch rifau'r cwestiynau a ymgeisiwyd gennych	At Ddibenion y Swyddfa
Qa	21
b	6
c	0
d	2
Q2a	8
b	2
c	2
d	0
e	7
Q3a	3
b	2
c	0
d	2
Cyfanswm	55%

55%

Q1.

a) i. $y = 6x^4 + 5x^3 + 3x^2 + 6x + 7$

$$\frac{dy}{dx} = 24x^3 + 15x^2 + 6x + 6 + 0 \quad 2$$

ii. $y = \sin 5x + 5 \cos 4x + 7 \tan 3x$

$$\frac{dy}{dx} = 5 \cos 5x - 20 \sin 4x + 21 \sec^2 3x \quad 2$$

iii. $y = 3 + x^{-5} + 4\sqrt{x}$

$$\frac{dy}{dx} = -5x^{-6} + \frac{1}{2}x^{-3/2} \quad 2$$

iv. $y = \underbrace{\sin 2x}_u \underbrace{e^{5x}}_v$

$$\frac{du}{dx} = 2 \cos 2x \quad \frac{dv}{dx} = 5e^{5x}$$

$$\frac{dy}{dx} = \sin 2x (5e^{5x}) + e^{5x} (2 \cos 2x) \quad 3$$

v. $y = 15(2x^3 + 3)^4$

$$60(2x^3 + 3)^3 (6x^2 + 0) \quad 3$$

vi. $y = \sqrt{7x^3 + 5x}$

$$\frac{dy}{dx} = \frac{1}{2}(7x^3 + 5x)^{-1/2} \times 21x^2 + 5 \quad 1$$

$$\frac{dy}{dx} = 21x^2 + 5x^{-1/2} \quad 1$$

vii. $y = \underbrace{4x^5}_u \underbrace{\ln x}_v$

$$\frac{du}{dx} = 20x^4 \quad \frac{dv}{dx} = \frac{1}{x}$$

$$\frac{dy}{dx} = 4x^5 \left(\frac{1}{x}\right) + \ln x (20x^4) \quad 4$$

viii. $y = \frac{4 \cos 4x}{e^{3x}}$

$$u = 4 \cos 4x \quad \frac{du}{dx} = -16 \sin 4x \quad v = e^{3x} \quad \frac{dv}{dx} = 3e^{3x}$$

$$\frac{dy}{dx} = \frac{e^{3x}(-16 \sin 4x) - 4 \cos 4x (3e^{3x})}{(e^{3x})^2} \quad 4$$

Q2a

21/23

b). $w = 4x^4 + 3x^3y^3 + 2y^2 + 25$

$w = 4x^4 + 3x^3y^3 + 2y^2 + 25$	$w = 4x^4 + 3x^3y^3 + 2y^2 + 25$
$\frac{dw}{dx} = 16x^3 + 9x^2y^3$ ✓	$\frac{dw}{dy} = 9x^3y^2 + 4y$ ✓
$\frac{d^2w}{dx^2} = 48x^2 + 18xy^3$ ✓	$\frac{d^2w}{dy^2} = 18x^3y + 4$ ✓
$\frac{d^2w}{dxdy} = 27x^2y^2$ ✓	$\frac{d^2w}{dydx} = 27x^2y^2$ ✓

9x3

c). $8x^2 + 6x - 15$
 $16x^2 + 6x - 0$ ✗
 $32x - 90x^2 = 0$ ✗

d). 4th derivative

$$y = 2 \cos 3x$$

$$\dot{y} = -6 \sin 3x$$

$$\ddot{y} = -18 \cos 3x$$

$$y''' = 54 \sin 3x$$

$$y^{(4)} = 162 \cos 3x$$

Q2.

$$a) \frac{2x+5}{(x-2)(x+1)} = \frac{A}{(x-2)} + \frac{B}{(x+1)} \checkmark$$

Q2a

$$\frac{(x-2)(x+1)A}{(x-2)} + \frac{(x-2)(x+1)B}{(x+1)} \quad \underline{\underline{8}}$$

$$2x+5 = A(x+1) + B(x-2) \checkmark$$

$$x = -1 \checkmark$$

$$2(-1)+5 = A(-1+1) + B(-1-2) \checkmark$$

$$2(-1)+5 = A(0) + B(-3) \checkmark$$

$$2(-1)+5 = 3$$

$$3 = B(-3) \checkmark$$

$$B = \frac{-3}{-3} \checkmark$$

$$B = -1 \checkmark$$

$$2x(2)+5 = A(x+1) + B(x-2) \checkmark$$

$$x = 2 \checkmark$$

$$2x(2)+5 = A(2+1) + B(2-2) \checkmark$$

$$2x(2)+5 = A(3) + B(0) \checkmark$$

$$2 \times 2 + 5 = 9$$

$$9 = A(3) \checkmark$$

$$A = \frac{9}{3} \checkmark$$

$$A = 3 \checkmark$$

$$b = 15 \quad c = 18$$

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

$$AB^2 = 15^2 + 18^2 - 2(15)(18) \cos(A) \checkmark$$

$$AB^2 = 225 + 324 - 540 \cos 100 \checkmark$$

$$AB^2 = 225 + 324 - 540(-0.173) \checkmark$$

$$AB^2 = 225 + 324 + 540 \cdot 0.173 \quad \underline{\underline{2}}$$

$$AB^2 = 1089.173 \text{ m}$$

$$AB = \sqrt{1089.17} \checkmark$$

$$AB = 33.00 \text{ m}$$

error carried
forward

Q2b2/4

c). $x^2 - 5x + 6$ $\begin{matrix} 3+2=5 \\ 3 \times 2 = 6 \end{matrix}$
 $(x-3)(x-2)$

$\tan^2 x - 5 \tan x + 6 = 0$
 $2 \tan x$

Q2c
2/6

d). $y = x^2 - 6x + 5$ $y = x - 3$
0 ?

Q2d
0

e). i. $\sin x = 0.85$
 $\sin^{-1}(0.85) = 58.21^\circ$
 $180 - 58.21 = 121.79^\circ$
 ~~$360 - 58.21 = 301.79^\circ$~~

Q2e
7/7

ii. $5 \cos x = 4$
 $\cos x = \frac{4}{5}$
 $\cos^{-1}(\frac{4}{5}) = 36.86^\circ$
 ~~$180 - 36.86 = 143.14^\circ$~~
 $360 - 36.86 = 323.14^\circ$

iii. $\tan x = -0.8$
 $\tan^{-1}(0.8) = 38.65^\circ$
 $180 - 38.65 = 141.35^\circ$
 $360 - 38.65 = 321.35^\circ$

Q3

i $\ln x + \ln(x-2) = \ln(x+10)$

$$\ln(x)(x-2) = \ln(x+10)$$

$$\ln(x^2 - 2) = \ln(x+10)$$

$$x^2 + x = -2 + 10$$

$$x^2 = 8$$

ii $\log(3x+2) + \log(x+1) = \log 12$

$$\log(3x+2)(x+1) = \log 12$$

$$\log(6x+2)(x) = \log 12$$

$$6x + x = 2 + 12$$

$$6x^2 = 14$$

iii $4^{(1-2x)} \times 6^{(3x+4)} = 12^{(5x)}$ $4 \times 6 = 24$

$$24^{(1-2x)} \times 24^{(3x+4)} = 12^{(5x)}$$

$$24^{1-2x+3x+4} = 12^{(5x)}$$

$$2x + 3x + 5x = 24 + 4 + 12$$

$$10x = 40$$

$$x = \frac{40}{10}$$

$$x = 4$$

iii

iv. $\frac{2x-2}{3x+9} = \frac{4}{3}$

$$3(2x-2) = 4(3x+9)$$

$$6x - 2 = 12x + 9$$

$$6x - 2 = 12x + 9$$

$$6x + 12x = -2 + 9$$

$$18x = 7$$

$$= \frac{7}{18}$$

$$x = 2.57$$

v. $\frac{(x+4)}{9} + \frac{(2x-1)}{7} = 12$

$$9 \times 7 = 63$$

$$63(x+4) + 63(2x-1) = 12 \times 63$$

$$63x + 252 + 126x - 63 = 756$$

$$189x = 567$$

$$x = \frac{567}{189}$$

$$x = 3$$

Q3a

3/18

b).

i.

$$z^2 = 9z + 14 \quad 7+2=9$$

$$(z-7)(z-2) \quad 7 \times 2 = 14$$

ii.

$$9^2 - 81 \rightarrow \sqrt{81} = 9 \quad \times \quad \underline{\underline{0}}$$

iii.

$$12xu - 3xv + 28yu - 7yv$$

$$(x - 36uv) + (y - 21uv) \quad \times \quad \underline{\underline{0}}$$

$$36(x - uv) + 21(y - uv) \quad \times \quad \underline{\underline{0}}$$

c).

$$8m^2 - 2m - 21 = 0$$

$$8(m-2)(m-21) = 0 \quad \times \quad \underline{\underline{0}}$$

ii.

$$w^2 + 13w + 40 = 0$$

$$(w+13)(w+40) = 0 \quad \times \quad \underline{\underline{0}}$$

d).

$$6x^2 - 8x - 30 = 0$$

$$a = 6 \quad \checkmark$$

$$b = -8 \quad \checkmark$$

$$c = -30 \quad \checkmark$$

$$\frac{-(-8) \pm \sqrt{8^2 - 4(6 \times -30)}}{2(6)}$$

$$= \frac{8 \pm \sqrt{64 + 720}}{12}$$

$$\frac{-(-8) \pm \sqrt{8^2 - 4(6 \times -30)}}{2(6)}$$

$$= \frac{8 \pm \sqrt{64 + 720}}{12}$$

Q3b

2/6

Q3c

0/4

Q3d

2/4