Edexcel

A Level

A Level Maths

Edexcel Core Maths C3 January 2013 Model Solutions

Name:

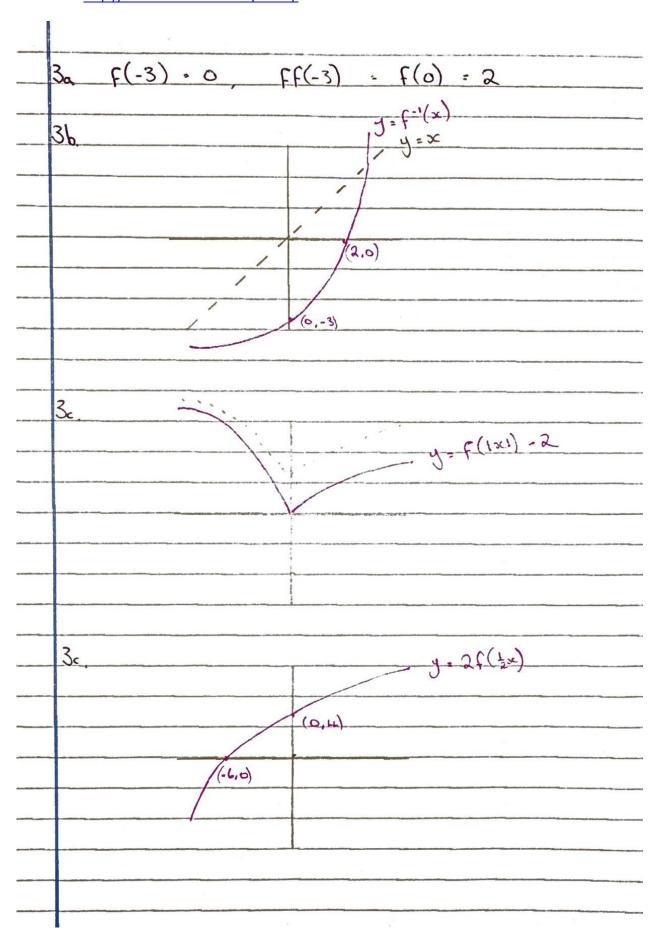


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Total Marks:

la y , $(2x-3)^5$ $-32 \cdot (2x-3)^5$ $=)$ $2x-3 = -2$ $x = 1/2 = w$ Ib $\frac{dy}{dx} = 5 \cdot 2 \cdot (2x-3)^m$ $\frac{dy}{dx} = \frac{10(2(\sqrt{2}) \cdot 3)^m}{2} = \frac{160}{2}$ $\frac{dy}{dx} = \frac{160(x-1/2)}{2}$ $\frac{dy}{dx} = \frac{160}{2}$ d	3	Edexcol Jan 13 C3
$x = \frac{1}{2} = \omega$ $\frac{1}{2} = \frac{1}{2} = \frac{1}{$	la.	y: (2x-3) ⁵
1b $\frac{d_{3}}{dx} = 5.2 (2x-3)^{4}$ 2 $10(2x-3)^{4}$ 2 $10(2(\sqrt{2})-3)^{4} = 160$ 2 $y+32=160(x-1/2)$ 2 $y+32=1$		$-32 - (2x-3)^5 = 2x-3 = -2$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	-	<u>α ε 1/2 = ω</u>
at P dy = $10(2(1/2) - 3)^{\frac{1}{2}} = 160$ => $9 + 32 = 160(x - 1/2)$ y = $160x - 112$ 2a, $g(x) = e^{x^{-1}} + x - 6 = 0$ $e^{x^{-1}} = 6 - x$ $x - 1 = 2n(6 - x)$ $x = 2n(6 - x) + 1$ 2b, $x_{n_{11}} = 2n(6 - x_{n_{1}}) + 1$ $x_{n_{11}} = 2n(6 - x_{n_{1}}) + 1$ 2c. $x = [2.3065, 2.3075]$ $g(2.3065) = -0.000275$ $g(2.3075) = 0.000412$	16	$\frac{d_{3}}{dx} = 5.2 (2x-3)^{4}$
$\Rightarrow y + 32 = 160(x - 1/2)$ $y \cdot 160x - 112$ $2a, g(x) = e^{x-1} + x - 6 = 0$ $e^{x-1} = 6 - x$ $x - 1 = 2n 6 - x $ $x \cdot 2 = 2n 6 - x + 1$ $2b, x_{n_{11}} = 2n (6 - x_{n_{1}}) + 1$ $x_{n_{12}} = 2n (6 - x_{n_{1}}) + 1$ $x_{n_{13}} = 2n (6 - x_{n_{1}}) + 1$ $x_{n_{14}} = 2n (6 - x_{n_{1}}) + 1$ $x_{n_{15}} = 2n (6 - x_{n_{15}}) + 1$ $x_{n_{15}} = 2n$		2 10 (2x-3)#
$y : 160x - 112$ $2a, g(x) := e^{x-1} + x - 6 = 0$ $e^{x-1} := 6 - x$ $x - 1 := 2n[6 - x]$ $x := 2n[6 - x] + 1$ $2b, x_{11} := 2n(6 - x_{1}) + 1$ $x_{2} := 2 : 2 \cdot 3863 , x_{2} := 2 \cdot 2847, x_{3} := 2 \cdot 312$ $2c. x \in [2 \cdot 3065, 2 \cdot 3075)$ $g(2 \cdot 3065) := -6 \cdot \infty0275,$ $g(2 \cdot 3075) := 0 \cdot \infty442$		at P $\frac{dy}{dx} = 10(2(\frac{y_2}{2}) - 3)^{\frac{1}{2}} = 160$
2a, $g(x) = e^{x-1} + x - 6 = 0$ $e^{x-1} = 6 - x$ $x - 1 = 2n[6-x]$ $x : 2n[6-x] + 1$ 2b. $x_{n_1} = 2n(6-x_n) + 1$ $x_n \cdot 2 = x_n \cdot 2 \cdot 3863 = x_n \cdot 2 \cdot 2847 = x_n \cdot 2 \cdot 312$ 2c. $x \in [2.3065, 2.3075]$ $g(2.3065) = -6.000275$ $g(2.3075) = 0.00442$		\Rightarrow $y + 32 = 160 (x - 1/2)$
$e^{x^{-1}} = 6 - x$ $x_{-1} = 2n 6-x $ $x_{-1} = 2n 6-x + 1$ $x_{$		y: 160x - 112
$x_{-1} = \ln 6-x $ $x_{-1} = \ln 6-x + 1$ $2b. x_{0+1} = \ln (6-x_{0}) + 1$ $x_{0} \cdot 2 x_{1} = 2 \cdot 3863 x_{2} = 2 \cdot 2847 x_{3} = 2 \cdot 312$ $2c. \alpha \in [2 \cdot 3065, 2 \cdot 3075]$ $g(2 \cdot 3065) = -6 \cdot 600275$ $g(2 \cdot 3075) = 0 \cdot 600442$	La.	9
$2b. x_{n_1} = \ln(6-x_n) + 1$ $2b. x_{n_2} = \ln(6-x_n) + 1$ $x_n \cdot 2 x_n \cdot 2 \cdot 3863 x_2 = 2 \cdot 2847 x_3 = 2 \cdot 312$ $2c. \alpha \in \left[2.3065, 2.3075\right]$ $g(2.3065) = -0.000275$ $g(2.3075) = 0.00442$		e = 6-x
χ_{0} : 2 χ_{1} : 2.3863 χ_{2} : 2.2847 χ_{3} : 2.312 2c. χ_{1} : χ_{1} : χ_{2} : χ_{2} : χ_{3} : χ		
2c. $\propto E[2.3065, 2.3075]$ $g(2.3065) = -0.000275$ $g(2.3075) = 0.00442$	26.	$x_{n_{1}} = l_{n}(6-x_{n}) + 1$
g(2.3065) = -0.000275, g(2.3075) = 0.00442		$\alpha_{2} : 2$, $\alpha_{1} : 2.3863$, $\alpha_{2} : 2.2847$, $\alpha_{3} : 2.312$
9(2.3075) = 0.00442	2e.	∝ E [2.3065, 2.3075)
change of sign => $\alpha \in (2.3065, 2.3075)$ => $\alpha : 2.807$ ho		•
	احا	nange of sign => $\alpha \in (2.3065, 2.3075)$ => $\alpha : 2.807 = 10.307$

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	40. 6 cos 0 + 8 sin 0 = R cos (0 - a)
	·
	6 cos0 + 8 sino = R (cos0 cosx + sino sinx)
_	
	R=62+82; R=10
	6 605 0 = 10 605 005 00 005 00 005 (6/10) = 0.927
	46. P(0) = 4 (12+6cos0+8sin0) 0 < 0 < 211
	P(0) : LL
	10 605 (0-0.927) +12
	man: 4 = 2
	12-10
	Libii max when sos (0-0.927) = -1
	Ø - 0·927 : π
	Ø : 4.07

5ai d x3ln2x	= $3x^2 \ln 2x + \frac{2x^3}{2x}$
dx	2=
	$3x^2\ln 2x + x^2$
$5bi$ $d \left(x + \sin 2x \right)^3$	= 3 (1+2cos2x)(x+sin2x)2
dx	
Sii. x = cot 4	x2 2 cot24
	u - 66
dr = c===2	=7 1, 1
dx 2 - cosee y	=7 dy = 1 dx cosec ² y
cosec24 = 1 + cot4	1 + x 2
es du - 1	
- so dy 1	2

6: (sin 22.5 + cos 22.5)2
2 512 22.5 + 25122.5 cos 22.5 + cos 22.5
$\frac{\left(\sin^2 22.5 + \cos^2 22.5 = 1\right)}{\left(2\sin 22.5\cos 22.5 = \sin45\%\right)}$
1 + 517 LS 2 1 - \(\sqrt{2}\)
611a. cos 20 + sn0 = 1
use: cos 20 ≡ 1-2sin²0 ¥ 0 € R
1-2sin30 + sin0 -1 = 0
$2\sin^2\theta - \sin\theta = 0 \qquad k = 2$
66. sino (2sino - 1) = 0 0 < 0 < 360°
sin 0 => 0 =0°, 180°
2 sin 0 = 1
sin0 = 1/2 => 0 = 30°, 150°
s A
T

Fa_		h(x)	- 2	2		-	14			18		-	
				x+2		<u> </u>	2+5		(x2.	-5)(z	(+5)		
			1	(2	(x2+	5)	+ 4(x +2)	4	181			
		(x2,5)	(x+2)										
		:	(x2 +	10 +	4×	+8	* 18						
			2(x2 +	2x)				2	×			e	
				(x+2)				x2-					
	~~~						2 -						(
76.			: 2x : 2			) <del>;</del> = ==================================							
						)							
	h	(x)		2(x2			(2x)						
			-	(	x2+5	)				-			
			•	- 2	z × +	10				· · · · · · · · · · · · · · · · · · ·			
				(x2	+5)2								
								~~~~~~					
Fc,		nox	Valu	ه و	3-1	~(x)	at	_na	×_p	sint			(
	h	(x)	- 0	 (2	>	2 x	2 =	(0					
						<u>x</u>	- 7	± 15		(+	J5	fon	ملر
	. / 5	-\										<u></u>	
	h(5	51		<u>15</u>		50_	Max.	point		_15	5		
-													
	60		0	< h	(x)		N5						
	-						5						
1													

8a V: 17,000 e +	2000 e + 500
E=0 =7 V : 19,5	00
86. V = 9,500	
: 17,000 e +	2000 e - 9000 = 0
17.000 e +	2000 - 9000 e = 0
17e = 90	+ 2 = 0
let e = >c , 3	2 = e/2
1. 9x2-17x	-2 = 0
(9x +1)(x-2) : 0
e = -1/9	cr e = 2
but $e^{x} > 0 + x \in \mathbb{R}$ so impossible	£ = ln2
30 114855.00	t: 42n2
8c. dV , - 4250 e - 0.	-1000 e
t:8, <u>dv</u> 593.	ц90
=> decreasing	at £593 p/a