Edexcel GCE
Core Mathematics C2
Gold Level G3
(Mark Scheme)

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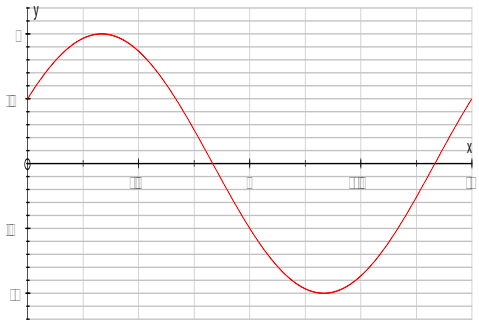
Question Number	Scheme	Marks
1.	$\int x^{-\frac{1}{2}}\,dx = \dfrac{x^{\frac{1}{2}}}{\left(\frac{1}{2}\right)}$ (o.e.)	M1 A1
	$\left[\dfrac{x^{\frac{1}{2}}}{\left(\frac{1}{2}\right)}\right]_1^8 = 2\sqrt{8} - 2 = -2 + 4\sqrt{2}$	M1 A1
	[or $4\sqrt{2} - 2$, or $2(2\sqrt{2} - 1)$, or $2(-1 + 2\sqrt{2})$]	**[4]**
2. (a)	$(7 \times \ldots \times x)$ or $(21 \times \ldots \times x^2)$	M1
	$(2 + kx)^7 = 2^7 + 2^6 \times 7 \times kx + 2^5 \times \binom{7}{2} k^2x^2$	
	$= 128;\quad + 448kx,\quad + 672k^2x^2$ [or $672(kx)^2$]	B1; A1 A1
		(4)
(b)	$6 \times 448k = 672k^2$	M1
	$k = 4$	A1
		(2) **[6]**
3.	$\left(2 - \frac{1}{2}x\right)^8 = 2^8 + \binom{8}{1}.2^7\left(-\frac{1}{2}x\right) + \binom{8}{2}2^6\left(-\frac{1}{2}x\right)^2 + \binom{8}{3}2^5\left(-\frac{1}{2}x\right)^3$	
	First term of 256	B1
	$\left({}^8C_1 \times \ldots \times x\right) + \left({}^8C_2 \times \ldots \times x^2\right) + \left({}^8C_3 \times \ldots \times x^3\right)$	M1
	$= (256) - 512x + 448x^2 - 224x^3$	A1 A1
		[4]
4. (a)	$x = \dfrac{\log 7}{\log 5}$ or $x = \log_5 7$	M1
	1.21	A1
		(2)
(b)	$(5^x - 7)(5^x - 5)$	M1 A1
	$(5^x = 7$ or $5^x = 5)$ $x = 1.2$ (awrt)	A1 ft
	$x = 1$	B1
		(4) **[6]**

Question Number	Scheme	Marks
5. (a)	$\tan\theta = \frac{2}{5}$ (or 0.4)	B1
		(1)
(b)	awrt 21.8 (α)	B1
	$180+\alpha$ $(=201.8)$, or $90+(\alpha/2)$	M1
	$360+\alpha$ $(=381.8)$, or $180+(\alpha/2)$ **or** $540+\alpha$ $(=561.8)$, or $270+(\alpha/2)$	M1
	Dividing at least one of the angles by 2	M1
	$x = 10.9,\ 100.9,\ 190.9,\ 280.9$ (Allow awrt)	A1
		(5) **[6]**
6. (a)	$(x-3)^2-9+(y+2)^2-4=12$	M1 A1
	Centre is (3, –2)	A1
	$(x-3)^2+(y+2)^2=12+"9"+"4"$	M1
	$r=\sqrt{12+"9"+"4"}=5$ (or $\sqrt{25}$ **)**	A1
		(5)
(b)	$PQ=\sqrt{(7--1)^2+(-5-1)^2}$ or $\sqrt{8^2+6^2}$	M1
	$= 10 = 2\times$radius, $\therefore$diam.	A1
		(2)
(c)	*R* must lie on the circle (angle in a semicircle theorem)…	B1
	$x=0 \Rightarrow \quad y^2+4y-12=0$	M1
	$(y-2)(y+6)=0 \quad y=.....$	dM1
	$y=-6$ or 2	A1
		(4) **[11]**

Question Number	Scheme	Marks
7. (a)	$\sin(x+45^\circ)=\frac{2}{3}$, so $(x+45^\circ)=41.8103...$ $(\alpha=41.8103...)$	M1
	So, $x+45^\circ=\{138.1897...,\ 401.8103...\}$	M1
	and $x=\{93.1897...,\ 356.8103...\}$	A1 A1
		(4)
(b)	$2(1-\cos^2 x)+2=7\cos x$	M1
	$2\cos^2 x+7\cos x-4=0$	A1 **oe**
	$(2\cos x-1)(\cos x+4)\{=0\}$, $\cos x=...$	M1
	$\cos x=\frac{1}{2}$, $\{\cos x=-4\}$	
	$\left(\beta=\frac{\pi}{3}\right)$	
	$x=\frac{\pi}{3}$ or $1.04719...^c$	B1
	$x=\frac{5\pi}{3}$ or $5.23598...^c$	B1 ft
		(6)
		[10]
8. (a)	$\log_2 y=-3 \Rightarrow y=2^{-3}$	M1
	$y=\frac{1}{8}$ or 0.125	A1
		(2)
(b)	$32=2^5$ or $16=2^4$ or $512=2^9$	M1
	[or $\log_2 32=5\log_2 2$ or $\log_2 16=4\log_2 2$ or $\log_2 512=9\log_2 2$]	
	[or $\log_2 32=\frac{\log_{10}32}{\log_{10}2}$ or $\log_2 16=\frac{\log_{10}16}{\log_{10}2}$ or $\log_2 512=\frac{\log_{10}512}{\log_{10}2}$]	
	$\log_2 32+\log_2 16=9$	A1
	$(\log x)^2=...$ or $(\log x)(\log x)=...$	M1
	$\log_2 x=3 \Rightarrow x=2^3=8$	A1
	$\log_2 x=-3 \Rightarrow x=2^{-3}=\frac{1}{8}$	A1ft
		(5)
		[7]

Question Number	Scheme	Marks
9. (a)	 Sine wave (anywhere) with at least 2 turning points. Starting on positive y-axis, going up to a max., then min. below x-axis, no further turning points in range, finishing above x-axis at $x = 2\pi$ or 360°. There must be <u>some</u> indication of scale on the y-axis…	M1 A1 (2)
(b)	$\left(0,\frac{1}{2}\right)$, $\left(\frac{5\pi}{6},0\right)$, $\left(\frac{11\pi}{6},0\right)$	B1 B1 B1 (3)
(c)	awrt 0.71 radians (0.70758…), or awrt 40.5° (40.5416…) (α)	B1
	$(\pi-\alpha)$ (2.43…) or $(180-\alpha)$	M1
	Subtract $\frac{\pi}{6}$ from α (or from $(\pi-\alpha)$)… or subtract 30	M1
	0.18 (or 0.06π), 1.91 (or 0.61π)	A1 A1 (5) **[10]**
10. (a)	$4x^2+6xy=600$	M1 A1
	$V=2x^2y=2x^2\left(\frac{600-4x^2}{6x}\right)$ $V=200x-\frac{4x^3}{3}$ (*)	M1 A1cso (4)
(b)	$\frac{dV}{dx}=200-4x^2$	B1
	Equate their $\frac{dV}{dx}$ to 0 and solve for x^2 or x : $x^2=50$ or $x=\sqrt{50}$	M1 A1
	Evaluate V: $V=200(\sqrt{50})-\frac{4}{3}(50\sqrt{50})=943\ \text{cm}^3$	M1 A1 (5)
(c)	$\frac{d^2V}{dx^2}=-8x$ Negative $\therefore$ Maximum	M1 A1ft (2) **[11]**

Statistics for C2 Practice Paper Gold Level G3

				Mean score for students achieving grade:							
Qu	**Max score**	**Modal score**	**Mean %**	**ALL**	**A***	**A**	**B**	**C**	**D**	**E**	**U**
1	4		68	2.70		3.64	3.25	2.87	2.52	2.00	0.97
2	6		68	4.05		5.54	4.86	4.23	3.54	2.77	1.48
3	4		90	3.60	3.99	3.92	3.66	3.64	3.25	3.18	2.25
4	6		55	3.28		4.83	3.63	3.02	2.48	2.05	1.33
5	6		46	2.77	5.84	4.87	3.67	2.72	1.83	1.07	0.33
6	11		46	5.11		8.71	6.39	4.80	3.28	2.03	0.66
7	10		56	5.61	9.79	9.00	7.40	5.72	3.89	2.26	0.64
8	7		44	3.11		4.64	3.32	2.83	2.47	2.09	1.22
9	10		46	4.57		7.93	5.73	4.14	2.91	1.84	0.78
10	11		48	5.24		9.41	6.72	4.55	2.81	1.58	0.52
	75		**53**	**40.04**		**62.49**	**48.63**	**38.52**	**28.98**	**20.87**	**10.18**