Edexcel GCE

Core Mathematics C2

Silver Level S1

(Mark Scheme)

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Question Number	Scheme	Marks
1.	$\left[(3-x)^6 =\right] 3^6 + 3^5 \times 6 \times (-x) + 3^4 \times \binom{6}{2} \times (-x)^2$	M1
	$= 729, \quad -1458x, \quad +1215x^2$	B1 A1 A1 **[4]**
2. (a)	$(2 + 3x)^4$ - Mark (a) and (b) together	
	$2^4 + {}^4C_1 2^3(3x) + {}^4C_2 2^2(3x)^2 + {}^4C_3 2^1(3x)^3 + (3x)^4$	
	First term of 16	B1
	$\left({}^4C_1 \times \ldots \times x\right) + \left({}^4C_2 \times \ldots \times x^2\right) + \left({}^4C_3 \times \ldots \times x^3\right) + \left({}^4C_4 \times \ldots \times x^4\right)$	M1
	$= (16 +)\ 96x + 216x^2 + 216x^3 + 81x^4$	A1 A1 (4)
(b)	$(2 - 3x)^4 = 16 - 96x + 216x^2 - 216x^3 + 81x^4$	B1ft (1) **[5]**
3. (a)	$f\left(\frac{1}{2}\right) = 2 \times \frac{1}{8} + a \times \frac{1}{4} + b \times \frac{1}{2} - 6$	M1
	$f\left(\frac{1}{2}\right) = -5 \ \Rightarrow \ \frac{1}{4}a + \frac{1}{2}b = \frac{3}{4}$ or $a + 2b = 3$	A1
	$f(-2) = -16 + 4a - 2b - 6$	M1
	$f(-2) = 0 \ \Rightarrow \ 4a - 2b = 22$	A1
	Eliminating one variable from 2 linear simultaneous equations in a and b	M1
	$a = 5$ and $b = -1$	A1 (6)
(b)	$2x^3 + 5x^2 - x - 6 = (x+2)(2x^2 + x - 3)$	M1
	$= (x+2)(2x+3)(x-1)$	M1A1 (3) **[9]**
4.	$\cos^{-1}(-0.4) = 113.58 \ (\alpha)$	B1
	$3x - 10 = \alpha \Rightarrow x = \frac{\alpha + 10}{3}$	M1
	$x = 41.2$	A1
	$(3x - 10 =) 360 - \alpha \ (246.4....)$	M1
	$x = 85.5$	A1
	$(3x - 10 =) 360 + \alpha \ (= 473.57....)$	M1
	$x = 161.2$	A1 **[7]**

Question Number	Scheme	Marks
5. (a)	**Usually answered in radians:**	
	Uses either $\frac{1}{2}ab\sin(\text{angle})$ **or** $\frac{1}{2}(12)^2(\text{angle})$ or both	M1
	$\text{Area} = \frac{1}{2}(23)(12)\sin 0.64$ **or** $\frac{1}{2}(12)^2(\pi - 0.64)$ $\{= \quad 82.41297091...$ **or** $180.1146711...\}$	A1
	$\text{Area} = \frac{1}{2}(23)(12)\sin 0.64 + \frac{1}{2}(12)^2(\pi - 0.64)$ $\{= \quad 82.41297091... + 180.1146711...\}$	A1
	$\{\text{Area} = 262.527642...\}$ = awrt 262.5 (m^2) or 262.4(m^2) or 262.6 (m^2)	A1
		(4)
(b)	$CDE = 12\times(angle),\ = 12(\pi - 0.64)\{\Rightarrow CDE = 30.01911...\}$	M1, A1
	$AE^2 = 23^2 + 12^2 - 2(23)(12)\cos(0.64) \Rightarrow AE^2 =$ or $AE =$ $\{AE = 15.17376...\}$	M1
	$\text{Perimeter} = 23 + 12 + 15.17376... + 30.01911...$	M1
	$= 80.19287... =$ awrt 80.2 (m)	A1
		(5)
		[9]
6. (a)	Seeing -4 and 2.	B1
		(1)
(b)	$x(x+4)(x-2) = \underline{x^3 + 2x^2 - 8x}$ or $\underline{x^3 - 2x^2 + 4x^2 - 8x}$	B1
	$\int(x^3 + 2x^2 - 8x)\,dx = \frac{x^4}{4} + \frac{2x^3}{3} - \frac{8x^2}{2}\{+c\}$ or $\frac{x^4}{4} - \frac{2x^3}{3} + \frac{4x^3}{3} - \frac{8x^2}{2}\{+c\}$	M1A1ft
	$\left[\frac{x^4}{4} + \frac{2x^3}{3} - \frac{8x^2}{2}\right]_{-4}^{0} = (0) - \left(64 - \frac{128}{3} - 64\right)$ **or** $\left[\frac{x^4}{4} + \frac{2x^3}{3} - \frac{8x^2}{2}\right]_{0}^{2} = \left(4 + \frac{16}{3} - 16\right) - (0)$	dM1
	One integral $= \pm 42\frac{2}{3}$ (42.6 or awrt 42.7) **or** other integral $= \pm 6\frac{2}{3}$ (6.6 or awrt 6.7)	A1
	Hence Area $= "their 42\frac{2}{3}" + "their 6\frac{2}{3}"$ or Area $= "their 42\frac{2}{3}" - "-their 6\frac{2}{3}"$	dM1
	$= 49\frac{1}{3}$ or 49.3 or $\frac{148}{3}$	A1
		(7)
		[8]

Question Number	Scheme	Marks
7. (a)	$r\theta = 7 \times 0.8 = 5.6$ (cm)	M1 A1 (2)
(b)	$\frac{1}{2}r^2\theta = \frac{1}{2} \times 7^2 \times 0.8 = 19.6$ (cm^2)	M1 A1 (2)
(c)	$BD^2 = 7^2 + (\text{their } AD)^2 - (2 \times 7 \times (\text{their } AD) \times \cos 0.8)$	M1
	$BD^2 = 7^2 + 3.5^2 - (2 \times 7 \times 3.5 \times \cos 0.8)$ (or awrt 46° for the angle)	A1
	Perimeter = (their DC) + "5.6" + "5.21" = 14.3 (cm)	M1 A1 (4)
(d)	$\Delta ABD = \frac{1}{2} \times 7 \times (\text{their } AD) \times \sin 0.8$ (ft their AD) (= 8.78…)	M1 A1ft
	Area = "19.6" – "8.78…" 10.8 (cm^2)	M1 A1 (4) **[12]**
8. (a)	$(x-6)^2 + (y-4)^2 = ; 3^2$	B1; B1 (2)
(b)	Complete method for MP: = $\sqrt{(12-6)^2 + (6-4)^2}$	M1
	= $\sqrt{40}$ or awrt 6.325	A1
	Complete method for cos θ, sin θ or tan θ	M1
	e.g. $\cos\theta = \frac{MT}{MP} = \frac{3}{\text{candidate's}\sqrt{40}}$ (= 0.4743) (θ = 61.6835°)	
	θ = 1.0766 rad	A1 (4)
(c)	Complete method for area TMP;	M1
	e.g. $\frac{1}{2} \times 3 \times \sqrt{40} \sin\theta$	
	$\frac{3}{2}\sqrt{31}$ (= 8.3516…) allow awrt 8.35	A1
	Area (sector) MTQ = 0.5 × 3^2 × 1.0766 (= 4.8446…)	M1
	Area TPQ = candidate' s (8.3516.. – 4.8446…)	M1
	= 3.507 awrt	A1 (5) **[11]**

Question Number	Scheme	Marks
9. (a)	$\left[y = 12x^{\frac{1}{2}} - x^{\frac{3}{2}} - 10 \right]$	
	$\left[y' = \right] \quad 6x^{-\frac{1}{2}} - \frac{3}{2}x^{\frac{1}{2}}$	M1 A1
	Puts their $\frac{6}{x^{\frac{1}{2}}} - \frac{3}{2}x^{\frac{1}{2}} = 0$	M1
	So $x =$ $, \frac{12}{3} = 4$	M1 A1
	$x = 4, \quad \Rightarrow \quad y = 12 \times 2 - 4^{\frac{3}{2}} - 10$, so $y = 6$	dM1 A1 (7)
(b)	$y'' = -3x^{-\frac{3}{2}} - \frac{3}{4}x^{-\frac{1}{2}}$	M1, A1 (2)
(c)	[Since $x > 0$] It is a maximum	B1 (1) **[10]**

Statistics for C2 Practice Paper Silver Level S1

				Mean score for students achieving grade:						
Qu	**Max score**	**Modal score**	**Mean %**	**ALL**	**A***	**A**	**B**	**C**	**D**	**E**	**U**
1	4		81	3.22		3.71	3.42	3.06	2.65	2.39	1.64
2	5		79	3.96	4.93	4.77	4.49	4.23	3.86	3.46	2.32
3	9		71	6.37		8.13	7.20	6.00	4.67	3.61	2.19
4	7		67	4.68	6.94	6.41	5.26	4.19	3.32	2.23	1.09
5	9		73	6.56	8.72	8.57	8.05	7.38	6.43	5.08	2.35
6	8		75	6.01	7.37	7.24	6.71	6.36	5.92	5.39	3.73
7	12		67	8.03		11.33	10.05	8.46	6.47	4.50	1.78
8	11		66	7.23		10.17	8.24	6.57	5.12	4.07	2.32
9	10		64	6.39		8.67	6.90	5.65	4.31	3.41	2.09
	75		**70**	**52.45**		**69.00**	**60.32**	**51.90**	**42.75**	**34.14**	**19.51**