Edexcel GCE
Core Mathematics C2
Gold Level G4
(Mark Scheme)

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Question Number	Scheme	Marks
1.	$\frac{dy}{dx} = 2 - 16x^{-3}$	M1 A1
	$2 - 16x^{-3} = 0$ so $x^{-3} =$ or $x^3 =$, or $2 - 16x^{-3} = 0$ so $x = 2$	M1
	$x = 2$ only (after correct derivative)	A1
	$y = 2 \times "2" + 3 + \frac{8}{"2^2"}$	M1
	$= 9$	A1 **[6]**
2.	$2\log x = \log x^2$	B1
	$\log_3 x^2 - \log_3 (x-2) = \log_3 \frac{x^2}{x-2}$	M1
	$\frac{x^2}{x-2} = 9$	A1 o.e.
	Solves $x^2 - 9x + 18 = 0$ to give $x = ...$	M1
	$x = 3$, $x = 6$	A1 **[5]**
3. (a)	$f(k) = -8$	B1 (1)
(b)	$f(2) = 4 \Rightarrow \quad 4 = (6-2)(2-k) - 8$	M1
	So $k = -1$	A1 (2)
(c)	$f(x) = 3x^2 - (2+3k)x + (2k-8) \quad = 3x^2 + x - 10$	M1
	$= (3x - 5)(x + 2)$	M1A1 (3) **[6]**
4. (a)	$\log_3 3x^2 = \log_3 3 + \log_3 x^2$ or $\log y - \log x^2 = \log 3$ or $\log y - \log 3 = \log x^2$	B1
	$\log_3 x^2 = 2\log_3 x$	B1
	Using $\log_3 3 = 1$	B1 (3)
(b)	$3x^2 = 28x - 9$	M1
	Solves $3x^2 - 28x + 9 = 0$ to give $x = \frac{1}{3}$ or $x = 9$	M1 A1 (3) **[6]**

Question Number	Scheme	Marks
5. (a)	$\frac{1}{2}r^2\theta = \frac{1}{2}(6)^2\left(\frac{\pi}{3}\right) = 6\pi$ or 18.85 or awrt 18.8 $(cm)^2$	M1 A1 (2)
(b)	$\sin\left(\frac{\pi}{6}\right) = \frac{r}{6-r}$	M1
	$\frac{1}{2} = \frac{r}{6-r}$	dM1
	$6 - r = 2r \Rightarrow r = 2$	A1 **cso** (3)
(c)	Area $= 6\pi - \pi(2)^2 = 2\pi$ or awrt 6.3 $(cm)^2$	M1 A1 **cao** (2) **[7]**
6. (a)	States or uses $\tan 2x = \frac{\sin 2x}{\cos 2x}$	M1
	$\frac{\sin 2x}{\cos 2x} = 5\sin 2x \Rightarrow \sin 2x - 5\sin 2x\cos 2x = 0$	
	$\Rightarrow \sin 2x(1 - 5\cos 2x) = 0$ *	A1 (2)
(b)	$\sin 2x = 0$ gives $2x = 0, 180, 360$ so $x = 0, 90, 180$	B1 B1
	$\cos 2x = \frac{1}{5}$ gives $2x = 78.46$ (or 78.5 or 78.4) **or** $2x = 281.54$ (or 281.6)	M1
	$x = 39.2$ (or 39.3), 140.8 (or 141)	A1 A1 (5) **[7]**
7. (i)	$\tan\theta = -1 \Rightarrow \quad \theta = -45, \quad 135$	B1 B1ft
	$\sin\theta = \frac{2}{5} \Rightarrow \quad \theta = 23.6, \quad 156.4$ (awrt: 24, 156)	B1 B1ft (4)
(ii)	$4\sin x = \frac{3\sin x}{\cos x}$	M1
	$4\sin x\cos x = 3\sin x \quad \Rightarrow \quad \sin x(4\cos x - 3) = 0$	M1
	Other possibilities (after squaring): $\sin^2 x(16\sin^2 x - 7) = 0$, $(16\cos^2 x - 9)(\cos^2 x - 1) = 0$	
	$x = 0, 180$ <u>seen</u>	B1 B1
	$x = 41.4, \quad 318.6$ (awrt: 41, 319)	B1 B1ft (6) **[10]**

Question Number	Scheme	Marks
8. (a)	N (2, -1)	B1 B1 (2)
(b)	$r = \sqrt{\frac{169}{4}} = \frac{13}{2} = 6.5$	B1 (1)
(c)	Find x coordinates, $x_2 - x_1 = 12$ and $\frac{x_1 + x_2}{2} = 2$ then solve	M1
	$x_1 = -4, \quad x_2 = 8$	A1ft A1ft
	Find y coordinates, using equation of circle or Pythagoras let d be the distance below N of A	
	then $d^2 = 6.5^2 - 6^2 \Rightarrow d = 2.5 \Rightarrow y = ..$	M1
	So $y_2 = y_1 = -3.5$	A1 (5)
(d)	Let $A\hat{N}B = 2\theta \Rightarrow \sin\theta = \frac{6}{"6.5"} \Rightarrow \theta = (67.38)...$	M1
	So angle ANB is 134.8 *	A1 (2)
(e)	AP is perpendicular to AN so using triangle ANP $\tan\theta = \frac{AP}{"6.5"}$	M1
	Therefore AP = 15.6	A1cao (2) **[12]**
9. (i)	$\sin(3x - 15) = \frac{1}{2}$ so $3x - 15 = 30 \quad (\alpha)$ and x = 15	M1 A1
	Need $3x - 15 = 180 - \alpha$ or $3x - 15 = 540 - \alpha$	M1
	Need $3x - 15 = 180 - \alpha$ and $3x - 15 = 360 + \alpha$ and $3x - 15 = 540 - \alpha$	M1
	x = 55 or 175	A1
	x = 55 , 135 , 175	A1 (6)
(ii)	At least one of $(\frac{a\pi}{10} - b) =$ 0 (or $n\pi$) $(\frac{a3\pi}{5} - b) = \pi$ {or $(n+1)\pi$} or in degrees or $(\frac{a11\pi}{10} - b) = 2\pi$ {or $(n+2)\pi$}	M1
	If two of **above equations** used eliminates a or b to find one or both of these or uses period property of curve to find a or uses other valid method to find either a or b	M1
	Obtains a = 2	A1
	Obtains $b = \frac{\pi}{5}$ (must be in radians)	A1 (4) **[10]**

Question Number	Scheme	Marks
10. (a)	Equation of form $(x \pm 5)^2 + (y \pm 9)^2 = k$, $k > 0$	M1
	Equation of form $(x - a)^2 + (y - b)^2 = 5^2$, with values for a and b	M1
	$(x + 5)^2 + (y - 9)^2 = 25 \ (= 5^2)$	A1
		(3)
(b)	$P(8, -7)$. Let centre of circle $= X(-5, 9)$	
	$PX^2 = (8 - "-5")^2 + (-7 - "9")^2$ or $PX = \sqrt{(8 - -5)^2 + (-7 - 9)^2}$	M1
	($PX = \sqrt{425}$ or $5\sqrt{17}$) $PT^2 = (PX)^2 - 5^2$ with numerical PX	dM1
	$PT \ \{= \sqrt{400}\} = 20$	A1 **cso**
		(3) **[6]**

Statistics for C2 Practice Paper Gold Level G4

Qu	Max score	Modal score	Mean %	Mean score for students achieving grade: ALL	A*	A	B	C	D	E	U
1	6		86	5.17	5.93	5.84	5.56	5.04	4.44	3.96	2.24
2	5		62	3.09	4.96	4.70	3.99	3.17	2.39	1.57	0.63
3	6		56	3.34		5.10	4.13	3.40	2.65	1.87	0.73
4	6		54	3.23	5.93	5.01	3.60	2.62	1.66	1.34	0.57
5	7		37	2.56	4.83	3.61	2.87	2.49	2.11	1.74	0.90
6	7		41	2.85	6.67	5.27	3.56	2.39	1.61	1.02	0.42
7	10		29	2.93		5.65	3.50	2.48	1.66	1.02	0.36
8	12		46	5.47		7.95	5.20	3.91	3.19	2.52	1.41
9	10		44	4.43	9.18	6.67	4.66	3.73	2.57	1.85	0.74
10	6		41	2.48	5.24	4.36	3.07	2.37	1.83	1.29	0.53
	75		**47**	**35.55**		**54.16**	**40.14**	**31.60**	**24.11**	**18.18**	**8.53**