

Edexcel GCE
Core Mathematics C2
Silver Level S4
(Mark Scheme)

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Question Number	Scheme	Marks
<p>1. (a)</p> <p>(b)</p>	<p>2.35, 3.13, 4.01</p> <p>$\frac{1}{2} \times 0.2 \dots\dots$</p> <p>$k \{(1+5) + 2(1.65 + p + q + r)\}$, k constant, $k \neq 0$</p> <p>$= 2.828$ (awrt 2.83)</p>	<p>B1 B1 (2)</p> <p>B1</p> <p>M1 A1</p> <p>A1 (4) [6]</p>
<p>2.</p>	<p>$y = (1+x)(4-x) = 4 + 3x - x^2$</p> <p>$\int (4 + 3x - x^2) dx = 4x + \frac{3x^2}{2} - \frac{x^3}{3}$</p> <p>$= [\dots\dots\dots]_1^4 = \left(16 + 24 - \frac{64}{3}\right) - \left(-4 + \frac{3}{2} + \frac{1}{3}\right) = \frac{125}{6} \quad \left(= 20\frac{5}{6}\right)$</p>	<p>M1</p> <p>M1 A1</p> <p>M1 A1 (5) [5]</p>
<p>3. (a)</p> <p>(b)</p> <p>(c)</p>	<p>$120000 \times (1.05)^3 = 138915 *$</p> <p>$120000 \times (1.05)^{n-1} > 200000$</p> <p>$\log 1.05^{n-1} > \log\left(\frac{5}{3}\right)$</p> <p>$(n-1 >) \frac{\log\left(\frac{5}{3}\right)}{\log 1.05}$ or equivalent</p> <p>2024</p> <p>$\frac{a(1-r^n)}{1-r} = \frac{120000(1-1.05^{11})}{1-1.05}$</p> <p>1704814</p>	<p>B1 (1)</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1 A1 (5)</p> <p>M1 A1</p> <p>A1 (3) [9]</p>

Question Number	Scheme	Marks
<p>4. (a)</p> <p>(b)</p> <p>(c)</p>	$x^2 + y^2 + 4x - 2y - 11 = 0$ $\{(x+2)^2 - 4 + (y-1)^2 - 1 - 11 = 0\}$ <p>Centre is $(-2, 1)$.</p> $(x+2)^2 + (y-1)^2 = 11 + 1 + 4$ <p>So $r = \sqrt{11 + 1 + 4} \Rightarrow r = 4$</p> <p>When $x = 0$, $y^2 - 2y - 11 = 0$</p> $y = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-11)}}{2(1)} \left\{ = \frac{2 \pm \sqrt{48}}{2} \right\}$ <p>So, $y = 1 \pm 2\sqrt{3}$</p>	<p>M1</p> <p>A1 cao</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>M1</p> <p>A1 aef</p> <p>M1</p> <p>A1 cao</p> <p>cso</p> <p>(4)</p> <p>[8]</p>
<p>5. (a)</p> <p>(b)</p>	$(8-3)^2 + (3-1)^2 \quad \text{or} \quad \sqrt{(8-3)^2 + (3-1)^2}$ $(x \pm 3)^2 + (y \pm 1)^2 = k \quad \text{or} \quad (x \pm 1)^2 + (y \pm 3)^2 = k \quad (k \text{ a positive value})$ $(x-3)^2 + (y-1)^2 = 29$ <p>Gradient of radius = $\frac{2}{5}$ (or exact equivalent)</p> <p>Gradient of tangent = $\frac{-5}{2}$</p> $y-3 = \frac{-5}{2}(x-8)$ $5x + 2y - 46 = 0 \text{ or equivalent}$	<p>M1 A1</p> <p>M1</p> <p>A1</p> <p>(4)</p> <p>B1</p> <p>M1</p> <p>M1</p> <p>A1 ft</p> <p>A1</p> <p>(5)</p> <p>[9]</p>

Question Number	Scheme	Marks
<p>6. (a)</p> <p>(b)</p>	$x = \frac{\log 0.8}{\log 8} \text{ or } \log_8 0.8, \quad = -0.107$ $2\log x = \log x^2$ $\log x^2 - \log 7x = \log \frac{x^2}{7x}$ <p>“Remove logs” to form equation in x, using the base correctly:</p> $\frac{x^2}{7x} = 3$ $x = 21$	<p>M1 A1 (2)</p> <p>B1</p> <p>M1</p> <p>M1</p> <p>A1cso (4)</p> <p>[6]</p>
<p>7. (a)</p> <p>(b)</p>	$2\log_3(x-5) = \log_3(x-5)^2$ $\log_3(x-5)^2 - \log_3(2x-13) = \log_3 \frac{(x-5)^2}{2x-13}$ <p>$\log_3 3 = 1$ seen or used correctly</p> $\log_3\left(\frac{P}{Q}\right) = 1 \Rightarrow P = 3Q \quad \left\{ \frac{(x-5)^2}{2x-13} = 3 \Rightarrow (x-5)^2 = 3(2x-13) \right\}$ $x^2 - 16x + 64 = 0 \quad (*)$ $(x-8)(x-8) = 0 \Rightarrow x = 8$	<p>B1</p> <p>M1</p> <p>B1</p> <p>M1</p> <p>A1 cso (5)</p> <p>M1 A1 (2)</p> <p>[7]</p>

Question Number	Scheme	Marks
8. (a)	$(h =) \frac{60}{\pi x^2}$ or exact equivalent	B1 (1)
(b)	$(A =) 2\pi x^2 + 2\pi xh$ or $(A =) 2\pi r^2 + 2\pi rh$ or $(A =) 2\pi r^2 + \pi dh$	B1
	Either $(A) = 2\pi x^2 + 2\pi x\left(\frac{60}{\pi x^2}\right)$ or As $\pi xh = \frac{60}{x}$	M1
	then $(A =) 2\pi x^2 + 2\left(\frac{60}{x}\right)$	
	$A = 2\pi x^2 + \left(\frac{120}{x}\right)$	* A1 cso (3)
(c)	$\left(\frac{dA}{dx}\right) = 4\pi x - \frac{120}{x^2}$ or $= 4\pi x - 120x^{-2}$	M1 A1
	$4\pi x - \frac{120}{x^2} = 0$ implies $x^3 =$	M1
	$x = \sqrt[3]{\frac{120}{4\pi}}$	dM1 A1 (5)
(d)	$A = 2\pi(2.12)^2 + \frac{120}{2.12}, = 85$	M1 A1 (2)
(e)	$\frac{d^2A}{dx^2} = 4\pi + \frac{240}{x^3}$ and sign considered	M1
	which is > 0 and therefore minimum	A1 (2)
		[11]

Question Number	Scheme	Marks
<p>9. (a)</p> <p>(b)</p>	$\sin(2\theta - 30) = -0.6$ or $2\theta - 30 = -36.9$ or implied by 216.9	B1
	$2\theta - 30 = 216.87 = (180 + 36.9)$	M1
	$\theta = \frac{216.87 + 30}{2} = 123.4$ or 123.5	A1
	$2\theta - 30 = 360 - 36.9$ or 323.1	M1
	$\theta = \frac{323.1 + 30}{2} = 176.6$	A1
	$9\cos^2 x - 11\cos x + 3(1 - \cos^2 x) = 0$ or	M1
	$6\cos^2 x - 11\cos x + 3(\sin^2 x + \cos^2 x) = 0$	
	$6\cos^2 x - 11\cos x + 3 = 0$ {as $(\sin^2 x + \cos^2 x) = 1$ }	A1
	$(3\cos x - 1)(2\cos x - 3) = 0$ implies $\cos x =$	M1
	$\cos x = \frac{1}{3}, \left(\frac{3}{2}\right)$	A1
	$x = 70.5$	B1
	$x = 360 - "70.5"$	M1
$x = 289.5$	A1cao	
(7) [12]		

Statistics for C2 Practice Paper Silver Level S4

Qu	Max score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	6		80	4.81	5.89	5.75	5.48	5.11	4.72	4.09	2.81
2	5		78	3.90		4.65	4.23	3.87	3.27	2.76	1.54
3	9		68	6.16	8.48	7.56	6.47	5.91	5.06	4.38	2.94
4	8		59	4.70	7.77	7.25	5.99	4.71	3.46	2.29	0.77
5	9		62	5.61		8.25	7.10	5.90	4.35	2.76	0.93
6	6		62	3.72		5.43	4.45	3.68	2.95	2.29	1.20
7	7		61	4.30	6.86	6.55	5.61	4.48	3.27	2.15	0.79
8	13		54	7.04	12.59	11.74	9.37	6.76	4.50	2.79	0.92
9	12		80	9.61	11.93	11.52	10.54	8.98	7.36	4.56	2.21
	75		66	49.85		68.70	59.24	49.40	38.94	28.07	14.11