

**Edexcel GCE  
Core Mathematics C2  
Bronze Level B4  
(Mark Scheme)**

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Question Number	Scheme	Marks
<p>1. (a)</p> <p>(b)</p> <p>(c)</p>	$\{r = \frac{2}{3}\}$ $\{p = \} 8$ $\{S_{15} = \frac{18(1 - (\frac{2}{3})^{15})}{1 - \frac{2}{3}}\}$ $\{S_{15} = 53.87668...\} \Rightarrow S_{15} = \text{awrt } 53.877$	<p>B1</p> <p>(1)</p> <p>B1 cao</p> <p>(1)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p><b>[4]</b></p>
<p>2.</p>	<p>The equation of the circle is <math>(x+1)^2 + (y-7)^2 = (r^2)</math></p> <p>The radius of the circle is <math>\sqrt{(-1)^2 + 7^2} = \sqrt{50}</math> or <math>5\sqrt{2}</math> or <math>r^2 = 50</math></p> <p>So <math>(x+1)^2 + (y-7)^2 = 50</math> or equivalent</p>	<p>M1 A1</p> <p>M1</p> <p>A1</p> <p><b>[4]</b></p>
<p>3. (a)</p> <p>(b)</p>	<p>1.732, 2.058, 5.196 awrt</p> $\frac{1}{2} \times 0.5 \dots\dots$ $\dots\dots \{(1.732 + 5.196) + 2(2.058 + 2.646 + 3.630)\}$ $= 5.899$	<p>B1 B1</p> <p>(2)</p> <p>B1</p> <p>M1 A1 ft</p> <p>A1</p> <p>(4)</p> <p><b>[6]</b></p>
<p>4. (a)</p> <p>(b)</p>	$(1 + \frac{x}{4})^8 = 1 + 2x + \dots\dots$ $+ \frac{8 \times 7}{2} (\frac{x}{4})^2 + \frac{8 \times 7 \times 6}{2 \times 3} (\frac{x}{4})^3,$ $= +\frac{7}{4}x^2 + \frac{7}{8}x^3 \quad \text{or} \quad = +1.75x^2 + 0.875x^3$ <p>States or implies that <math>x = 0.1</math></p> <p>Substitutes their value of <math>x</math> (provided it is <math>&lt;1</math>) into series obtained in part (a)</p> <p>i.e. <math>1 + 0.2 + 0.0175 + 0.000875, = 1.2184</math></p>	<p>B1</p> <p>M1 A1</p> <p>A1</p> <p>(4)</p> <p>B1</p> <p>M1</p> <p>A1 cao</p> <p>(3)</p> <p><b>[7]</b></p>

Question Number	Scheme	Marks
<p>5. (a)</p> <p>(b)</p> <p>(c)</p>	<p><math>x = 2</math> gives 2.236 (allow AWRT) Accept <math>\sqrt{5}</math></p> <p><math>x = 2.5</math> gives 2.580 (allow AWRT) Accept 2.58</p> <p><math>\left(\frac{1}{2} \times \frac{1}{2}\right), [(1.414 + 3) + 2(1.554 + 1.732 + 1.957 + 2.236 + 2.580)]</math>  <math>= 6.133</math> (AWRT 6.13, even following minor slips)</p> <p>Overestimate</p> <p>'Since the trapezia lie <u>above the curve</u>', or an equivalent explanation, or sketch of (one or more) trapezia above the curve on a diagram (or on the given diagram, in which case there should be reference to this).</p>	<p>B1</p> <p>B1</p> <p>(2)</p> <p>B1 M1</p> <p>A1ft</p> <p>A1</p> <p>(4)</p> <p>B1</p> <p>dB1</p> <p>(2)</p> <p><b>[8]</b></p>
<p>6. (a)</p> <p>(b)</p>	<p><math>\binom{40}{4} = \frac{40!}{4!b!}; (1+x)^n</math> coefficients of <math>x^4</math> and <math>x^5</math> are <math>p</math> and <math>q</math> respectively</p> <p><math>b = 36</math></p> <p>Term 1: <math>\binom{40}{4}</math> or <math>{}^{40}C_4</math> or <math>\frac{40!}{4!36!}</math> or <math>\frac{40(39)(38)(37)}{4!}</math> or 91 390</p> <p>Term 2: <math>\binom{40}{5}</math> or <math>{}^{40}C_5</math> or <math>\frac{40!}{5!35!}</math> or <math>\frac{40(39)(38)(37)(36)}{5!}</math> or 658 008</p> <p>Hence, <math>\frac{q}{p} = \frac{658008}{91390} \left\{ = \frac{36}{5} = 7.2 \right\}</math></p>	<p>B1</p> <p>(1)</p> <p>M1</p> <p>A1</p> <p>A1 oe cso</p> <p>(3)</p> <p><b>[4]</b></p>

Question Number	Scheme	Marks
7. (a)	$\{ ar = 192 \text{ and } ar^2 = 144 \}$ $r = \frac{144}{192}$ $r = \frac{3}{4} \text{ or } 0.75$	M1 A1 (2)
(b)	$a(0.75) = 192$ $a \left\{ = \frac{192}{0.75} \right\} = 256$	M1 A1 (2)
(c)	$S_{\infty} = \frac{256}{1-0.75}$ So, $\{S_{\infty} =\} 1024$	M1 A1 cao (2)
(d)	$\frac{256(1 - (0.75)^n)}{1 - 0.75} > 1000$ $(0.75)^n < 1 - \frac{1000(0.25)}{256} \left\{ = \frac{6}{256} \right\}$ $n \log(0.75) < \log\left(\frac{6}{256}\right)$ $n > \frac{\log\left(\frac{6}{256}\right)}{\log(0.75)} = 13.0471042... \Rightarrow n = 14$	M1 M1 M1 A1 cso (4) <b>[10]</b>
8. (a)	$r\theta = 6 \times 0.95, = 5.7 \text{ (cm)}$	M1, A1 (2)
(b)	$\frac{1}{2} r^2 \theta = \frac{1}{2} \times 6^2 \times 0.95, = 17.1 \text{ (cm}^2\text{)}$	M1, A1 (2)
(c)	Let $AD = x$ then $\frac{x}{\sin 0.95} = \frac{6}{\sin 1.24}$ so $x = 5.16$ * OR $x = 3 / \cos 0.95$ OR so $x = 3 / \sin 0.62$ so $x = 5.16$ * OR $x^2 = 6^2 + x^2 - 12x \cos 0.95$ leading to $x =$ , so $x = 5.16$ *	M1 A1 (2)
(d)	Perimeter = '5.7'+5.16 +6 - 5.16= "11.7" <b>or 6 + their 5.7</b>	M1A1 ft (2)
(e)	Area of triangle $ABD = \frac{1}{2} \times 6 \times 5.16 \times \sin 0.95 = 12.6$ or $\frac{1}{2} \times 6 \times 3 \times \tan 0.95 = 12.6$ ( $\frac{1}{2}$ base x height) or $\frac{1}{2} \times 5.16 \times 5.16 \times \sin 1.24 = 12.6$ So Area of $R = '17.1' - '12.6' = 4.5$	M1 A1 M1 A1 (4) <b>[12]</b>

Question Number	Scheme	Marks
<p><b>9. (a)</b></p>	$\frac{dy}{dx} = 3x^2 - 20x + k$ <p>At <math>x = 2</math>, <math>\frac{dy}{dx} = 0</math>, so <math>12 - 40 + k = 0</math>      <math>k = 28</math>      (*)</p> <p>N.B. The ' = 0 ' must be seen at some stage to score the final mark.</p>	<p>M1 A1</p> <p>A1 cso</p> <p>(3)</p>
<p><b>(b)</b></p>	$\int (x^3 - 10x^2 + 28x) dx = \frac{x^4}{4} - \frac{10x^3}{3} + \frac{28x^2}{2}$ $\left[ \frac{x^4}{4} - \frac{10x^3}{3} + 14x^2 \right]_0^2 = \dots \quad \left( = 4 - \frac{80}{3} + 56 = \frac{100}{3} \right)$ <p>y-coordinate of <math>P = 8 - 40 + 56 = 24</math>      <u>Allow if seen in part (a)</u></p> <p>Area of rectangle = <math>2 \times</math> (their y - coordinate of <math>P</math>)</p> <p>Area of <math>R =</math> (their 48) <math>-</math> <math>\left( \text{their } \frac{100}{3} \right) = \frac{44}{3} \left( 14\frac{2}{3} \text{ or } 14.\dot{6} \right)</math></p>	<p>M1 A1</p> <p>M1</p> <p>B1</p> <p>M1 A1</p> <p>(6)</p> <p><b>[9]</b></p>
<p><b>10. (a)</b></p>	$\left( \frac{dy}{dx} = \right) 8 + 2x - 3x^2$ $3x^2 - 2x - 8 = 0 \quad (3x + 4)(x - 2) = 0 \quad x = 2$	<p>M1 A1</p> <p>A1 cso</p> <p>(3)</p>
<p><b>(b)</b></p>	<p>Area of triangle = <math>\frac{1}{2} \times 2 \times 22</math></p> $\int 10 + 8x + x^2 - x^3 dx = 10x + \frac{8x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4}$ $\left[ 10x + \frac{8x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} \right]_0^2 = \dots \left( = 20 + 16 + \frac{8}{3} - 4 \right)$ <p>Area of <math>R = 34\frac{2}{3} - 22 = \frac{38}{3} \left( = 12\frac{2}{3} \right)</math> (Or 12.6)</p>	<p>M1 A1</p> <p>M1 A1 A1</p> <p>M1</p> <p>M1 A1</p> <p>(8)</p> <p><b>[11]</b></p>

## Statistics for C2 Practice Paper Bronze Level B4

Qu	Max score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	4		83	3.33	3.94	3.89	3.76	3.61	3.41	3.04	1.98
2	4		79	3.17	3.96	3.83	3.49	3.19	2.61	2.10	0.94
3	6		79	4.73		5.80	5.44	4.97	4.42	3.77	2.54
4	7		71	5.00	6.97	6.45	5.50	4.66	3.78	3.35	2.13
5	8		71	5.67		6.98	6.38	5.95	5.38	4.78	3.26
6	4		75	2.99	3.80	3.59	3.19	2.87	2.59	2.13	1.16
7	10		74	7.41	9.61	9.24	8.57	7.95	7.15	6.09	3.13
8	12		77	9.26	11.53	11.31	10.29	9.00	7.44	5.87	3.42
9	9		66	5.92	8.89	8.53	7.66	6.50	5.03	3.41	1.24
10	11		68	7.46		10.62	9.57	8.15	6.11	4.04	1.32
	<b>75</b>		<b>73</b>	<b>54.94</b>		<b>70.24</b>	<b>63.85</b>	<b>56.85</b>	<b>47.92</b>	<b>38.58</b>	<b>21.12</b>