

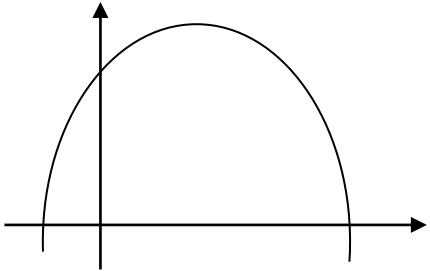
**Edexcel GCE**  
**Core Mathematics C1**  
**Practice Paper B3**  
**(Mark scheme)**

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Question number	Scheme	Marks
<p><b>1.</b> (a)</p> <p>(b)</p>	<p><math>4x(x+3)</math> or <math>x(4x+12)</math> (or use of quadratic formula)</p> <p><math>x = 0</math>    <math>x = -3</math></p> <p>Using <math>b^2 - 4ac = 0</math>    <math>144 - 16c = 0</math>    <math>c = 9</math></p> <p><math>(2x+3)(2x+3) = 0</math>    <math>x = \dots</math> (or quadratic formula)</p> <p><math>x = -\frac{3}{2}</math></p>	<p>M1</p> <p>A1 A1    (3)</p> <p>M1 A1</p> <p>M1</p> <p>A1    (4)</p> <p><b>(7 marks)</b></p>
<p><b>2.</b> (a)</p> <p>(i)</p> <p>(ii)</p>	<p><math>u_2 = \sqrt{\left(\frac{3}{2} + \frac{20}{3}\right)}</math>    = 2.85773....    = <u>2.86</u></p> <p><math>u_3 =</math>    2.90300...    = <u>2.90</u></p> <p><math>u_4 =</math>    2.88806....    = <u>2.89</u></p> <p>[If <math>u_3 =</math> AWRT 2.90 and <math>u_4 =</math> AWRT 2.89 penalise once only]</p> <p><math>3 = \sqrt{\left(\frac{3}{2} + \frac{a}{3}\right)}</math>    or    <math>9 = \frac{3}{2} + \frac{a}{3}</math></p> <p><math>\frac{a}{3} = 9 - \frac{3}{2}</math>    or    <math>a = 3\left(9 - \frac{3}{2}\right)</math></p> <p><math>a = 22.5</math></p> <p>(If <math>u_1 = u_2</math>, then <math>u_2 = u_3, \dots</math>)    <math>u_5 = \underline{\underline{3}}</math></p>	<p>M1</p> <p>A1 c.a.o</p> <p>A1 c.a.o</p> <p>(3)</p> <p>M1</p> <p>M1</p> <p>A1    (3)</p> <p>B1</p> <p>(1)</p> <p><b>(7 Marks)</b></p>



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<p><b>5.</b> (a)</p> <p>(b)</p>	<p><math>\sqrt{8} = 2\sqrt{2}</math> seen or used somewhere (possibly implied).</p> <p><math>\frac{12}{\sqrt{8}} = \frac{12\sqrt{8}}{8}</math> or <math>\frac{12}{2\sqrt{2}} = \frac{12\sqrt{2}}{4}</math></p> <p>Direct statement, e.g. <math>\frac{6}{\sqrt{2}} = 3\sqrt{2}</math> (no indication of method) is M0.</p> <p>At <math>x = 8</math>, <math>\frac{dy}{dx} = 3\sqrt{8} + \frac{12}{\sqrt{8}} = 6\sqrt{2} + 3\sqrt{2} = 9\sqrt{2}</math> (*)</p> <p>Integrating: <math>\frac{3x^{3/2}}{(3/2)} + \frac{12x^{1/2}}{(1/2)} (+C)</math> (C not required)</p> <p>At (4, 30), <math>\frac{3 \times 4^{3/2}}{(3/2)} + \frac{12 \times 4^{1/2}}{(1/2)} + C = 30</math> (C required)</p> <p>(f(x) =) <math>2x^{3/2} + 24x^{1/2}, -34</math></p>	<p>B1</p> <p>M1</p> <p>A1 (3)</p> <p>M1 A1 A1</p> <p>M1</p> <p>A1, A1 (6)</p> <p><b>(9 Marks)</b></p>
<p><b>6.</b> (a)</p> <p>(b)</p> <p>(c)</p>	<p><math>S = a + (a + d) + (a + 2d) + \dots + [a + (n - 1)d]</math></p> <p><math>S = [a + (n - 1)d] + [a + (n - 2)d] + \dots + a</math></p> <p>Add: <math>2S = n[2a + (n - 1)d] \Rightarrow S = \frac{1}{2}n[2a + (n - 1)d]</math></p> <p><math>a = 54000</math> and <math>n = 9</math></p> <p><math>619200 = \frac{1}{2} \times 9 \times (2 \times 54000 + 8d)</math></p> <p><math>d = 3700</math></p> <p><math>a + (n - 1)d = a + 10d = 54000 + 10d = \pounds 91000</math></p>	<p>B1</p> <p>M1</p> <p>M1 A1 (4)</p> <p>B1</p> <p>M1 A1ft</p> <p>A1 (4)</p> <p>M1 A1 (2)</p> <p><b>(8 marks)</b></p>

Question number	Scheme	Marks
<p><b>7.</b> (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	<p>Mid-point of <math>AB = [\frac{1}{2}(-3 + 8), \frac{1}{2}(-2 + 4)] = (\frac{5}{2}, 1)</math></p> <p><math>M_{AB} = \frac{4 - (-2)}{8 - (-3)}, = \frac{6}{11}</math></p> <p>Equation of <math>AB: y - 4 = \frac{6}{11}(x - 8)</math></p> <p><math>\Rightarrow 11y - 44 = 6x - 48, \quad \Rightarrow 6x - 11y - 4 = 0</math> (or equivalent)</p> <p>Gradient of tangent <math>= -\frac{11}{6}</math></p> <p>Equation: <math>y - 4 = -\frac{11}{6}(x - 8)</math> (or <math>6y + 11x - 112 = 0</math>)</p> <p>Equation of <math>l: y = \frac{2}{3}x</math></p> <p>Substitute into part (c): <math>\frac{2}{3}x - 4 = -\frac{11}{6}x + \frac{88}{6}</math></p> <p><math>\Rightarrow x = 7\frac{7}{15}, y = 4\frac{44}{45}</math></p>	<p>M1, A1 (2)</p> <p>M1, A1</p> <p>M1</p> <p>A1 (4)</p> <p>B1 ft</p> <p>M1 A1 (3)</p> <p>B1</p> <p>M1</p> <p>A1, A1 (4)</p> <p><b>(13 marks)</b></p>
<p><b>8.</b> (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p> <p>(d)</p> <p>(e)</p>	<p>9</p>  <p>Shape</p> <p>Position of max.</p> <p>5 on y-axis</p> <p>-1 and 5 on x-axis</p> <p>Gradient: <math>\frac{8 - (-7)}{3 - (-2)}</math></p> <p><math>y - 8 = \text{“gradient”}(x - 3)</math>                      <math>y = 3x - 1</math></p> <p>Where <math>y = 0, x = \frac{1}{3}</math></p> <p>Mid point: <math>(\frac{-7 + 8}{2}, \frac{-2 + 3}{2}) = (\frac{1}{2}, \frac{1}{2})</math>                      <math>k = 1</math></p>	<p>B1 (1)</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>M1 A1 (5)</p> <p>M1 A1</p> <p>M1 A1 (4)</p> <p>M1 A1ft (2)</p> <p>M1 A1 (2)</p> <p><b>(14 marks)</b></p>