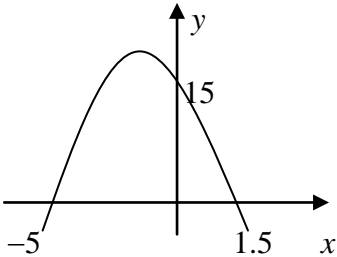


**Edexcel GCE**  
**Core Mathematics C1**  
**Practice Paper A3**  
**(Mark scheme)**

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Question number	Scheme	Marks
<b>1.</b> (a) (b)	$y = 5x - x^{-1} + C$ $7 = 5 - 1 + C, \quad C = 3$ $x = 2: \quad y = 10 - \frac{1}{2} + 3 = 12\frac{1}{2}$	M1 A2 (1,0) (3) M1 A1 ft M1 A1 (4) <b>(7 marks)</b>
<b>2.</b> (a) (b) (c)	$77 \quad 74$ $d = 74 - 77 = -3$ $S_{50} = \frac{1}{2}n[2a + (n-1)d] = 25[(2 \times 77) + (49 \times -3)]$ $= 175$	B1 B1 (2) B1 ft (1) M1 A1 A1 (3) <b>(6 marks)</b>
<b>3</b> (a) (b)	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{1+5}{2}, \frac{2+8}{2}\right) = (3,5)$ $\text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8-2}{5-1}$ $y - 2 = m(x - 1) \quad y = \frac{3}{2}x + \frac{1}{2}$ $\text{Allow } y = \frac{3x+1}{2} \text{ or } y = \frac{1}{2}(3x+1)$	M1 A1 (2) M1 A1 M1 A1 (4) <b>(6 marks)</b>
<b>4.</b> (a) (b)	$4x(x + 3) \quad \text{or} \quad x(4x + 12) \quad (\text{or use of quadratic formula})$ $x = 0 \quad x = -3$ $\text{Using } b^2 - 4ac = 0 \quad 144 - 16c = 0 \quad c = 9$ $(2x + 3)(2x + 3) = 0 \quad x = \dots (\text{or quadratic formula})$ $x = -\frac{3}{2}$	M1 A1 A1 (3) M1 A1 M1 A1 (4) <b>(7 marks)</b>

Question number	Scheme	Marks
<b>5.</b> (a)	$6x - 2x < 3 + 7$ $x < 2\frac{1}{2}$	M1 A1 (2)
(b)	$(2x - 1)(x - 5)$ Critical values $\frac{1}{2}$ and 5	M1 A1
(c)	$\frac{1}{2} < x < 5$	M1 A1 ft (4)
(c)	$\frac{1}{2} < x < 2\frac{1}{2}$	B1 ft (1)  <b>(7 marks)</b>
<b>6.</b> (a)	$f(x) = 0 \Rightarrow 2x^2 + 7x - 15 = 0$ $(2x - 3)(x + 5) = 0$ $\therefore$ points are $(\frac{3}{2}, 0), (-5, 0); (0, 15)$  	attempt to solve $f(x) = 0$ M1 A1 (both); B1 (3)  shape B1  vertex in correct quadrant B1 ft (2)  <b>(5 marks)</b>

Question number	Scheme	Marks
7. (a)	$u_1 = 1.05 \times 500\,000 - 15\,000 = 510\,000$	M1
	$u_2 = \qquad \qquad \qquad = 520\,000$	
	$u_3 = \qquad \qquad \qquad = 531\,525$	A1 (all 3)
	The population is increasing	B1 (3)
	$u_1 = 425\,000$	
	$u_2 = 346\,250$	
	(b) $u_2 = 263\,562.5 \qquad \qquad \qquad u_5 = 85\,577.64\dots$	M1
	$u_2 = 136\,740.625 \qquad \qquad \qquad u_6 = -10\,143.41\dots62.5$	A1
	$u_5 > 0, u_6 < 0$ so population died out during 6 <sup>th</sup> year	B1 (3)
	(c) Require $u_1 = u_0$ i.e. $1.05 \times 500\,000 - d = 500\,000$ i.e. $d = 0.05 \times 500\,000$ i.e. $d = 25\,000$	M1  A1 (2)

**(8 marks)**

Question number	Scheme	Marks
8.	<p>(a) <math>\frac{dy}{dx} = 3x^2 - 10x + 5</math></p> <p>(b) <math>3x^2 - 10x + 5 = 2</math>                      <math>3x^2 - 10x + 3 = 0</math>  <math>(3x - 1)(x - 3) = 0</math>                      <math>x = \frac{1}{3}</math></p> <p>(c) When <math>x = 3</math>, <math>y = 27 - 45 + 15 + 2 = -1</math>  <math>y + 1 = 2(x - 3)</math>                      <math>y = 2x - 7</math></p> <p>(d) <math>R: x = 0</math>      <math>y = -7</math>      <math>S: y = 0</math>      <math>x = 3.5</math>      (Both for M1)  <math>RS = \sqrt{(7^2 + (\frac{7}{2})^2} = \frac{7}{2}\sqrt{5}</math>                      (or equivalent)</p>	<p>M1 A1      (2)</p> <p>M1 A1      (2)</p> <p>B1</p> <p>M1 A1      (3)</p> <p>M1 A1 ft</p> <p>M1 A1      (4)</p> <p><b>(11 marks)</b></p>
9.	<p>(a) Gradient of <math>AB = \frac{4}{8} = \frac{1}{2}</math></p> <p>(b) Gradient of <math>BC = -2</math>, <math>\frac{4-2}{k-7} = -2</math>                      (or full Pythag. Method)  <math>k = 6</math></p> <p>(c) <math>AB = \sqrt{(4^2 + 8^2)}</math>  <math>= \sqrt{80} = \sqrt{16}\sqrt{5} = 4\sqrt{5}</math></p> <p>(d) <math>BC = \sqrt{(1^2 + 2^2)} = \sqrt{5}</math>                      (or <math>AC = \sqrt{(7^2 + 6^2)} = \sqrt{85}</math>)  Area of <math>ABC = \frac{1}{2} (4\sqrt{5} \times \sqrt{5}) = 10</math></p> <p style="text-align: center;">Other exact methods can score M1 A2.  Non-exact methods score M1 A0 ( but may gain the B1)</p> <p>(e) <math>y - 2 = -2(x - 7)</math>  <math>2x + y - 16 = 0</math></p>	<p>M1 A1      (2)</p> <p>M1</p> <p>A1      (2)</p> <p>M1 A1</p> <p>A1      (3)</p> <p>B1ft</p> <p>M1 A1      (3)</p> <p>B1</p> <p>B1      (2)</p> <p><b>(12 marks)</b></p>