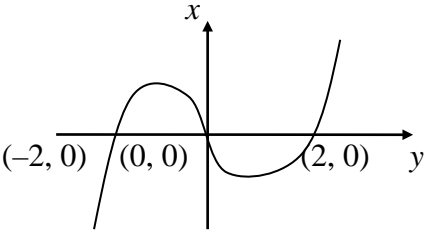
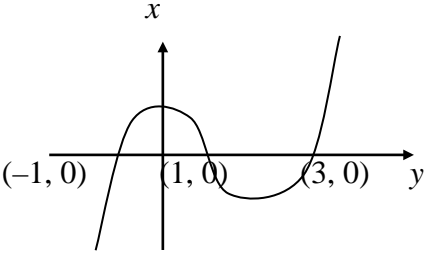


Question number	Scheme	Marks
1.	$10 + x^2 > x^2 - 2x$ $10 > -2x \quad x > -5$	B1 M1 A1 <b>(3 marks)</b>
2.	$\frac{x^3}{3} - \frac{x^{-1}}{-1} + \frac{x^{\frac{4}{3}}}{\frac{4}{3}}$ <p style="text-align: center;">(A1 for 2 terms correct, A1 for all correct)</p> $= \frac{x^3}{3} + x^{-1} + \frac{3x^{\frac{4}{3}}}{4} + C$	M1 A1 A1 B1 (for C) <b>(4 marks)</b>
3.	(a) 9 (b) $81^{\frac{1}{4}} = 3 \quad 3^3 = 27$ (c) $\frac{1}{27}$	B1 (1) M1 A1 (2) B1 ft (1) <b>(4 marks)</b>
4.	(a) $4k - 7$ (b) $4(4k - 7) - 7 = 16k - 35$ (c) $16k - 35 = 13 \quad k = 3$	B1 M1 A1 (2) M1 A1 (2) <b>(5 marks)</b>
5.	(a) $y = 8 - 2x \quad 3x^2 + x(8 - 2x) = 1$ $x^2 + 8x - 1 = 0 \quad (*)$ (b) $x = \frac{-8 \pm \sqrt{64 + 4}}{2} = -4 \pm \dots$ $\sqrt{68} = 2\sqrt{17} ; x = -4 + \sqrt{17} \text{ or } x = -4 - \sqrt{17}$ $y = 8 - 2(-4 + \sqrt{17}) = 16 - 2\sqrt{17} \text{ or } y = 16 + 2\sqrt{17}$	M1 A1 (2) M1 A1 B1 M1 A1 (5) <b>(7 marks)</b>

Question number	Scheme	Marks
6.	<p>(a) <math>\frac{(2x+1)(x+4)}{\sqrt{x}} = \frac{2x^2+9x+4}{\sqrt{x}} = 2x^{\frac{3}{2}}+9x^{\frac{1}{2}}+4x^{-\frac{1}{2}}</math> [P = 2, Q = 9, R = 4]</p> <p>(b) <math>f'(x) = 3x^{\frac{1}{2}} + \frac{9}{2}x^{-\frac{1}{2}} - 2x^{-\frac{3}{2}}</math> (A1 ft for one term, fractional power)</p> <p>(c) Gradient of tangent = <math>f'(1) = 3 + \frac{9}{2} - 2 = \frac{11}{2}</math></p> <p>Gradient of line = <math>\frac{11}{2}</math>, equal gradients, <math>\therefore</math> parallel.</p>	<p>M1 A2(1, 0) (3)</p> <p>M1 A1 ft A1 (3)</p> <p>M1 A1 ft</p> <p>A1 (3)</p> <p><b>(9 marks)</b></p>
7.	<p><math>x, (x-2)(x+2)</math></p>  <p>Shape B1 Through origin B1 (dep.) -2 and 2 B1 (3)</p>  <p>Curve translated +1 parallel to x-axis B1 ft -1, 1 and 3 (B1 ft for one value) B1 ft B1 (3)</p> <p><b>(9 marks)</b></p>	<p>B1, M1 A1 (3)</p> <p>B1</p> <p>B1 (dep.)</p> <p>B1 (3)</p> <p>B1 ft</p> <p>B1 ft B1 (3)</p> <p><b>(9 marks)</b></p>
8.	<p>(a) Gradient of <math>l_2</math> is <math>-\frac{1}{3}</math></p> <p><math>y - 2 = -\frac{1}{3}(x - 6)</math>      <math>y = -\frac{1}{3}x + 4</math></p> <p>(b) <math>-\frac{1}{3}x + 4 = 3x - 6</math>      <math>x = 3</math></p> <p><math>y = 3</math></p> <p>(c) <math>y = 0</math>;      <math>l_1: x = 2</math>      <math>l_2: x = 12</math></p> <p><math>(2, 0), (12, 0), (3, 3)</math> Area of triangle = <math>\frac{1}{2}(10 \times 3) = 15</math></p>	<p>B1</p> <p>M1 A1 ft (3)</p> <p>M1 A1</p> <p>A1 ft (3)</p> <p>B1 B1 ft</p> <p>M1 A1 (4)</p> <p><b>(10 marks)</b></p>

Question number	Scheme	Marks
<p><b>9.</b> (a)</p> <p>(b)</p> <p>(c)</p>	$S = a + (a + d) + \dots + [a + (n - 1)d]$ $S = [a + (n - 1)d] + \dots + a$ <p>Add: <math>2S = n[2a + (n - 1)d], \quad S = \frac{1}{2}n[2a + (n - 1)d] \quad (*)</math></p> $a + 15d = 6$ $\frac{1}{2}n[2a + (n - 1)d] = 8(2a + 15d) = 72$ <p>Solve simultaneously: <math>a = 3 \quad 3\text{cm}</math></p> $a = 3: 15d = 6 - 3 = 3 \quad d = 0.2$	<p>B1</p> <p>M1</p> <p>M1 A1 (4)</p> <p>B1</p> <p>M1 A1</p> <p>M1 A1 (5)</p> <p>M1 A1 (2)</p> <p><b>(11 marks)</b></p>
<p><b>10.</b> (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	$\frac{d^2y}{dx^2} = 3x^2 + 2$ <p>Since <math>x^2</math> is always positive, <math>\frac{d^2y}{dx^2} \geq 2</math> for all <math>x</math>.</p> $y = \frac{x^4}{4} + x^2 - 7x + (k) \quad [k \text{ not required here}]$ $4 = \frac{2^4}{4} + 2^2 - 14 + k \quad k = 10 \quad y = \frac{x^4}{4} + x^2 - 7x + 10$ $x = 2: \frac{dy}{dx} = 8 + 4 - 7 = 5$ <p>Gradient of normal = <math>-\frac{1}{5}</math></p> $y - 4 = -\frac{1}{5}(x - 2) \quad x + 5y - 22 = 0$	<p>M1 A1 (2)</p> <p>B1 (1)</p> <p>M1 A2 (1, 0)</p> <p>M1 A1 (5)</p> <p>M1 A1</p> <p>M1</p> <p>M1 A1 (5)</p> <p><b>(13 marks)</b></p>

<b>Qn</b>	<b>Spec Ref</b>	<b>AO1</b>	<b>AO2</b>	<b>AO3</b>	<b>AO4</b>	<b>AO5</b>
<b>1</b>	1.7	2	1			
<b>2</b>	1.1, 5.1, 5.2	3	1			
<b>3</b>	1.1	3				1
<b>4</b>	3.1	3	2			
<b>5</b>	1.6, 1.2, 1.5	4	1			2
<b>6</b>	1.1, 1.8, 4.1, 4.2, 4.3	4	3	2		
<b>7</b>	1.8, 1.9, 1.10	3	2	4		
<b>8</b>	2.1, 2.2	3	5	2		
<b>9</b>	3.2	3	4		4	
<b>10</b>	5.1, 5.2, 4.1, 4.2, 4.3	5	7		1	
		<b>33</b>	<b>26</b>	<b>8</b>	<b>5</b>	<b>3</b>