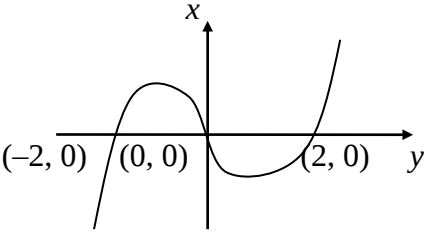
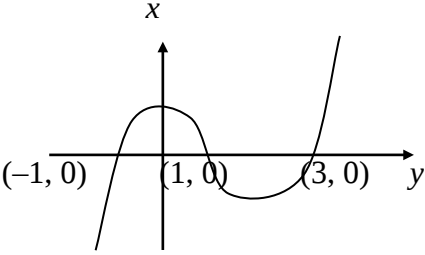


| Question number | Scheme                                                                                                                                                                                                                                                                                                        | Marks                                                        |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 1.              | $10 + x^2 > x^2 - 2x$<br>$10 > -2x \quad x > -5$                                                                                                                                                                                                                                                              | B1<br>M1 A1<br><b>(3 marks)</b>                              |
| 2.              | $\frac{x^3}{3} - \frac{x^{-1}}{-1} + \frac{x^{\frac{4}{3}}}{\frac{4}{3}}$ <p>(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<br>B1 (for C)<br><b>(4 marks)</b>                   |
| 3.              | (a) 9<br>(b) $81^{\frac{1}{4}} = 3 \quad 3^3 = 27$<br>(c) $\frac{1}{27}$                                                                                                                                                                                                                                      | B1 (1)<br>M1 A1 (2)<br>B1 ft (1)<br><b>(4 marks)</b>         |
| 4.              | (a) $4k - 7$<br>(b) $4(4k - 7) - 7 = 16k - 35$<br>(c) $16k - 35 = 13 \quad k = 3$                                                                                                                                                                                                                             | B1<br>M1 A1 (2)<br>M1 A1 (2)<br><b>(5 marks)</b>             |
| 5.              | (a) $y = 8 - 2x \quad 3x^2 + x(8 - 2x) = 1$<br>$x^2 + 8x - 1 = 0 \quad (*)$<br>(b) $x = \frac{-8 \pm \sqrt{64 + 4}}{2} = -4 \pm \dots$<br>$\sqrt{68} = 2\sqrt{17} \quad ; x = -4 + \sqrt{17} \text{ or } x = -4 - \sqrt{17}$<br>$y = 8 - 2(-4 + \sqrt{17}) = 16 - 2\sqrt{17} \text{ or } y = 16 + 2\sqrt{17}$ | M1<br>A1 (2)<br>M1 A1<br>B1<br>M1 A1 (5)<br><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<br/>Through origin B1 (dep.)<br/>-2 and 2 B1 (3)</p>  <p>Curve translated +1 parallel to x-axis<br/>-1, 1 and 3 (B1 ft for one value)</p>                                                                                                                                            | <p>B1, M1 A1 (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                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>9.</b> (a)   | $S = a + (a + d) + \dots + [a + (n - 1)d]$<br>$S = [a + (n - 1)d] + \dots + a$<br>Add: $2S = n[2a + (n - 1)d]$ , $S = \frac{1}{2}n[2a + (n - 1)d]$ (*) | B1<br>M1<br>M1 A1 (4)          |
| (b)             | $a + 15d = 6$<br>$\frac{1}{2}n[2a + (n - 1)d] = 8(2a + 15d) = 72$<br>Solve simultaneously: $a = 3$ 3cm                                                 | B1<br>M1 A1<br>M1 A1 (5)       |
| (c)             | $a = 3: 15d = 6 - 3 = 3$ $d = 0.2$                                                                                                                     | M1 A1 (2)<br><b>(11 marks)</b> |
| <b>10.</b> (a)  | $\frac{d^2y}{dx^2} = 3x^2 + 2$                                                                                                                         | M1 A1 (2)                      |
| (b)             | Since $x^2$ is always positive, $\frac{d^2y}{dx^2} \geq 2$ for all $x$ .                                                                               | B1 (1)                         |
| (c)             | $y = \frac{x^4}{4} + x^2 - 7x + (k)$ [k not required here]                                                                                             | M1 A2 (1, 0)                   |
|                 | $4 = \frac{2^4}{4} + 2^2 - 14 + k$ $k = 10$ $y = \frac{x^4}{4} + x^2 - 7x + 10$                                                                        | M1 A1 (5)                      |
| (d)             | $x = 2: \frac{dy}{dx} = 8 + 4 - 7 = 5$<br>Gradient of normal $= -\frac{1}{5}$                                                                          | M1 A1<br>M1                    |
|                 | $y - 4 = -\frac{1}{5}(x - 2)$ $x + 5y - 22 = 0$                                                                                                        | M1 A1 (5)<br><b>(13 marks)</b> |

**Specification/Assessment Objective grid**  
**C1 Mock Paper**

| <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,<br>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,<br>4.1, 4.2, 4.3 | 5          | 7          |            | 1          |            |
|           |                            | <b>33</b>  | <b>26</b>  | <b>8</b>   | <b>5</b>   | <b>3</b>   |