GCE Examinations

Advanced Subsidiary

Core Mathematics C1

Paper L

MARKING GUIDE

This guide is intended to be as helpful as possible to teachers by providing concise solutions and indicating how marks could be awarded. There are obviously alternative methods that would also gain full marks.

Method marks (M) are awarded for knowing and using a method.

Accuracy marks (A) can only be awarded when a correct method has been used.

(B) marks are independent of method marks.

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C1 Paper L – Marking Guide
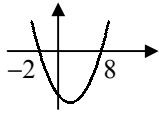
1. $= \sqrt{49} + (\sqrt[3]{8})^2 = 7 + 2^2$ B1 M1

     $= 11$ A1   **(3)**

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2.   *(a)* $u_4 = \frac{5+1}{3} = 2$ B1

     (b) $5 = \frac{u_2 + 1}{3}$, $u_2 = 14$ M1 A1

          $14 = \frac{u_1 + 1}{3}$, $u_1 = 41$ A1   **(4)**

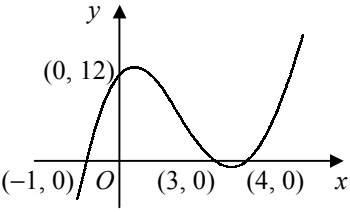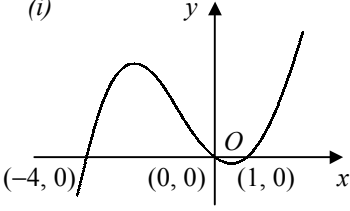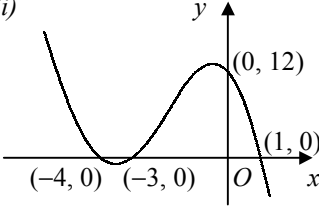**3.**   *(a)* $b^2 - 4ac = 12^2 - (4 \times 4 \times 9) = 0$ M1

          $\therefore$ 1 real root   A1

     (b) $4x^2 + 12x + 9 = 8$

          $4x^2 + 12x + 1 = 0$

          $x = \frac{-12 \pm \sqrt{144 - 16}}{8}$ M1

            $= \frac{-12 \pm 8\sqrt{2}}{8}$ M1

            $= -\frac{3}{2} \pm \sqrt{2}$ A2   **(6)**

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4.   *(a)* $5x > 15$ M1

          $x > 3$ A1

     (b) $(x + 2)(x - 8) < 0$ M1

                 M1

          $-2 < x < 8$ A1

     (c) $3 < x < 8$ B1   **(6)**

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5.   *(a)* $(2 - \sqrt{x})^2 = 0$

          $\sqrt{x} = 2$ M1

          $x = 4$ A1

     (b) $= (2 - \sqrt{3})^2 = 4 - 4\sqrt{3} + 3 = 7 - 4\sqrt{3}$ M1 A1

     (c) $= \int (2 - \sqrt{x})^2 \, dx$

          $= \int (4 - 4\sqrt{x} + x) \, dx$ B1

          $= 4x - \frac{8}{3}x^{\frac{3}{2}} + \frac{1}{2}x^2 + c$ M1 A2   **(8)**

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6.   *(a)*   grad $= \frac{-4 - 6}{1 - (-3)} = -\frac{5}{2}$ M1 A1

          $\therefore \ y - 6 = -\frac{5}{2}(x + 3)$ M1

            $2y - 12 = -5x - 15$

            $5x + 2y + 3 = 0$ A1

     (b) m: $y = -\frac{2}{k}x - \frac{7}{k}$ $\therefore$ grad $= -\frac{2}{k}$ M1 A1

          l and m perp. $\therefore \ -\frac{5}{2} \times -\frac{2}{k} = -1$ M1

               $k = -5$ A1   **(8)**

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7. (a) $f(x) = \int \left(5 + \frac{4}{x^2}\right)\ dx$

   $f(x) = 5x - 4x^{-1} + c$ M1 A2

(b) $f(1) = 5 - 4 + c = 1 + c$ M1

   $f(2) = 10 - 2 + c = 8 + c$

   $f(2) = 2f(1)$ $\therefore$ $8 + c = 2(1 + c)$ M1

              $c = 6$ A1

   $f(x) = 5x - 4x^{-1} + 6$

   $f(4) = 20 - 1 + 6 = 25$ M1 A1   **(8)**

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8. (a) LHS $= (x + 1)(x^2 - 7x + 12)$ M1

   $= x^3 - 7x^2 + 12x + x^2 - 7x + 12$ M1

   $= x^3 - 6x^2 + 5x + 12 =$ RHS   A1

(b)

       B3

(c) (i)   (ii)

       B2 B2

                                               (10)

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9. (a) (i) $= (t^2 - 5) - (t - 1) = t^2 - t - 4$ M1 A1

   (ii) $= (t^2 - 5) + (t^2 - t - 4) = 2t^2 - t - 9$ M1 A1

(b) $2t^2 - t - 9 = 19$

   $2t^2 - t - 28 = 0$

   $(2t + 7)(t - 4) = 0$ M1

   $t > 0$ $\therefore$ $t = 4$ A1

(c) $a = 4 - 1 = 3,\ d = 16 - 4 - 4 = 8$ B1

   $u_{10} = 3 + (9 \times 8) = 3 + 72 = 75$ M1 A1

(d) $= \frac{40}{2}[6 + (39 \times 8)] = 20 \times 318 = 6360$ M1 A1   **(11)**

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10. (a) $A\ (0, 2)$ B1

   $\dfrac{dy}{dx} = 3 - 2x$ M1 A1

   grad $= 3$ M1

   $\therefore\ y = 3x + 2$ A1

(b) grad of $m = 3$

   grad of curve at $B = \dfrac{-1}{3} = -\dfrac{1}{3}$ M1 A1

   at B: $3 - 2x = -\dfrac{1}{3}$

         $x = \dfrac{5}{3}$ M1 A1

   $y = 2 + 3\left(\dfrac{5}{3}\right) - \left(\dfrac{5}{3}\right)^2 = 4\tfrac{2}{9}$ $\therefore$ $B\left(1\tfrac{2}{3}, 4\tfrac{2}{9}\right)$ M1 A1   **(11)**

                                                       Total   **(75)**

Performance Record – C1 Paper L

Question no.	1	2	3	4	5	6	7	8	9	10	Total
Topic(s)	indices	recur. relation	quad. formula	inequals	surds, integr.	straight lines	integr.	curve sketch, transform.	AP	diff., tangent	
Marks	3	4	6	6	8	8	8	10	11	11	75
Student											

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