FOR EDEXCEL

GCE Examinations

Advanced Subsidiary

Core Mathematics C1

Paper F

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.

Solomon Press

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C1 Paper F – Marking Guide

1. $x^4 - 5x^2 - 14 = 0, \quad (x^2 + 2)(x^2 - 7) = 0$ M1
$x^2 = -2$ (no solutions) or 7 A1
$x = \pm\sqrt{7}$ A1 **(3)**

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2. $= \frac{2}{3\sqrt{5}+7} \times \frac{3\sqrt{5}-7}{3\sqrt{5}-7} = \frac{6\sqrt{5}-14}{45-49} = \frac{7}{2} - \frac{3}{2}\sqrt{5}$ M2 A1 **(3)**

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3. *(a)* $x = (\sqrt[3]{27})^2 = 3^2 = 9$ M1 A1

(b) $= (\frac{9}{4})^{-\frac{1}{2}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$ M1 A1 **(4)**

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4. cubic, coeff of $x^3 = 1$, crosses x-axis at $(-1, 0)$, touches at $(3, 0)$
$\therefore \ y = (x + 1)(x - 3)^2$ M1 A1
$= (x + 1)(x^2 - 6x + 9)$
$= x^3 - 6x^2 + 9x + x^2 - 6x + 9$ M1
$= x^3 - 5x^2 + 3x + 9$
$\therefore \ a = -5, b = 3, c = 9$ A2 **(5)**

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5. *(a)* $y = \frac{1}{2}x^2 - \frac{3}{2}x^{-2}$ M1 A1

$\frac{dy}{dx} = x + 3x^{-3}$ M1 A1

(b) $\frac{d^2y}{dx^2} = 1 - 9x^{-4} = \frac{x^4 - 9}{x^4}$ M1 A1 **(6)**

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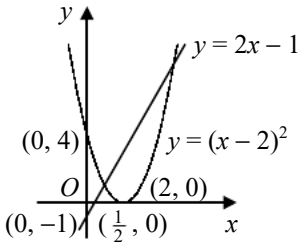
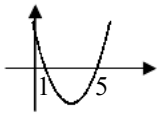
6. *(a)*



B2

B3

(b) $x^2 - 4x + 4 > 2x - 1$
$x^2 - 6x + 5 > 0$
$(x - 1)(x - 5) > 0$ M1
M1



$x < 1$ or $x > 5$ A1 **(8)**

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7. *(a)* $\frac{dy}{dx} = \frac{1}{2} + x^{-2}$ M1 A1

grad $= \frac{1}{2} + 2^{-2} = \frac{3}{4}$ M1 A1

(b) $x = 2 \ \therefore \ y = \frac{7}{2}$ B1

$y - \frac{7}{2} = \frac{3}{4}(x - 2)$ M1
$4y - 14 = 3x - 6$
$3x - 4y + 8 = 0$ A1

(c) at B, grad $= \frac{3}{4}$
$\therefore \ \frac{1}{2} + x^{-2} = \frac{3}{4}$ M1
$x^2 = 4, \quad x = 2$ (at A), -2 A1
$\therefore \ B\ (-2, \frac{5}{2})$ A1 **(10)**

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8. *(a)* $y - 3 = \frac{3}{2}(x - 5)$ M1

$y = \frac{3}{2}x - \frac{9}{2}$ A1

(b) $3x - 4(\frac{3}{2}x - \frac{9}{2}) + 3 = 0$ M1

$x = 7$ A1

$\therefore B\ (7, 6)$ A1

(c) $= (\frac{5+7}{2}, \frac{3+6}{2}) = (6, \frac{9}{2})$ M1 A1

(d) l_2: $y = \frac{3}{4}x + \frac{3}{4}$ $\therefore$ grad $= \frac{3}{4}$ B1

$\therefore\ y - \frac{9}{2} = \frac{3}{4}(x - 6)$ M1

$y = \frac{3}{4}x$ A1

when $x = 0, y = 0$ $\therefore$ passes through origin A1 **(11)**

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

$\frac{4}{2}(2a + 3d) = 22\frac{3}{4}$ (2) M1 A1

(2) $\Rightarrow$ $4a + 6d = 22\frac{3}{4}$

(1) $\Rightarrow$ $3a + 6d = 16\frac{1}{2}$

subtracting, $a = 22\frac{3}{4} - 16\frac{1}{2} = 6\frac{1}{4}$ M1 A1

$d = \frac{1}{2}(5\frac{1}{2} - 6\frac{1}{4}) = -\frac{3}{8}$ M1 A1

(b) $6\frac{1}{4} - \frac{3}{8}(n - 1) > 0$ M1

$50 - 3(n - 1) > 0$

$n < 17\frac{2}{3}$ $\therefore$ 17 positive terms M1 A1

(c) $= S_{17} = \frac{17}{2}[12\frac{1}{2} + (16 \times -\frac{3}{8})]$ M1

$= \frac{17}{2}(12\frac{1}{2} - 6) = \frac{17}{2} \times \frac{13}{2} = \frac{221}{4} = 55\frac{1}{4}$ A1 **(12)**

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10. *(a)* grad $= 8 - 2 = 6$ B1

$\therefore\ y - 1 = 6(x - 1)$ M1

$y = 6x - 5$ A1

(b) $y = \int (8x - \frac{2}{x^3})\ dx$

$y = 4x^2 + x^{-2} + c$ M1 A2

$(1, 1)$ $\therefore\ 1 = 4 + 1 + c$

$c = -4$ M1

$y = 4x^2 + x^{-2} - 4$ A1

(c) $4x^2 + x^{-2} - 4 = 0$

$4x^4 - 4x^2 + 1 = 0$ M1

$(2x^2 - 1)^2 = 0$ M1

$x^2 = \frac{1}{2}$

$x = \pm\frac{1}{\sqrt{2}}$ A1

$x = \pm\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \pm\frac{1}{2}\sqrt{2}$ M1 A1 **(13)**

Total **(75)**

Performance Record – C1 Paper F

Question no.	1	2	3	4	5	6	7	8	9	10	Total
Topic(s)	quad.	surds	indices	cubic	diff.	curve sketch, inequal.	diff., tangents	straight lines	AP	integr., tangent	
Marks	3	3	4	5	6	8	10	11	12	13	75
Student											