Solomon Press
Core Mathematics C1

Paper E

(Mark Scheme)

Mr.S.V.Swarnaraja (Marking Examiner, Team Leader & Author)
www.swanash.com, Mobile: +94777304755 , email: swa@swanash.com

FOR EDEXCEL

GCE Examinations

Advanced Subsidiary

Core Mathematics C1

Paper E

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.

Written by Shaun Armstrong

C1 Paper E – Marking Guide

1. *(a)* $= \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 6\sqrt{3}$ — M1 A1

(b) $= 4 - 2\sqrt{3} - 4\sqrt{3} + 6 = 10 - 6\sqrt{3}$ — M1 A1 **(4)**

---

2. $3x^2 - 5 = 2x$ — M1

$3x^2 - 2x - 5 = 0$

$(3x - 5)(x + 1) = 0$ — M1

$x = -1,\ \frac{5}{3}$ — A2 **(4)**

---

3. $x - 5y = 7 \quad \Rightarrow \quad y = \frac{1}{5}x - \frac{7}{5} \quad \therefore$ grad $= \frac{1}{5}$ — B1

grad $m = \frac{-1}{\frac{1}{5}} = -5$ — M1 A1

$\therefore\ y - 1 = -5(x + 4)$ — M1

$y = -5x - 19$ — A1 **(5)**

---

4. *(a)* 1, 7, 25, 79 — B2

(b) $7 = a + b$ — M1

$25 = 7a + b$ — A1

subtracting, $6a = 18$ — M1

$a = 3,\ b = 4$ — A1 **(6)**

---

5. *(a)* $8x - x^{\frac{5}{2}} = 0$

$x(8 - x^{\frac{3}{2}}) = 0$

$x = 0$ (at O) or $x^{\frac{3}{2}} = 8$ — M1

$\therefore\ x = (\sqrt[3]{8})^2 = 4$ — M1 A1

(b) $\frac{dy}{dx} = 8 - \frac{5}{2}x^{\frac{3}{2}}$ — M1 A1

grad $= 8 - (\frac{5}{2} \times 8) = -12$ — M1 A1 **(7)**

---

6. *(a)* $f(x) = 2[x^2 - 2x] + 1$ — M1

$= 2[(x - 1)^2 - 1] + 1$ — M1

$= 2(x - 1)^2 - 1, \qquad a = 2,\ b = -1,\ c = -1$ — A2

(b) $x = 1$ — B1

(c) $2(x - 1)^2 - 1 = 3$

$(x - 1)^2 = 2$ — M1

$x = 1 \pm \sqrt{2}$ — M1 A1 **(8)**

---

7. *(a)* $f(x) = \frac{x^2 - 8x + 16}{2x^{\frac{1}{2}}}$ — M1

$f(x) = \frac{1}{2}x^{\frac{3}{2}} - 4x^{\frac{1}{2}} + 8x^{-\frac{1}{2}}, \qquad A = \frac{1}{2},\ B = -4,\ C = 8$ — A2

(b) $f'(x) = \frac{3}{4}x^{\frac{1}{2}} - 2x^{-\frac{1}{2}} - 4x^{-\frac{3}{2}}$ — M1 A2

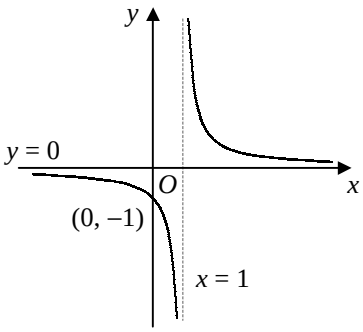
$f'(x) = \frac{1}{4}x^{-\frac{3}{2}}(3x^2 - 8x - 16)$ — M1

$f'(x) = \frac{1}{4}x^{-\frac{3}{2}}(3x + 4)(x - 4) = \frac{(3x + 4)(x - 4)}{4x^{\frac{3}{2}}}$ — M1 A1 **(9)**

---

8. *(a)* translation by 1 unit in the positive x-direction — B2

(b)



B3

(c) $\frac{1}{x-1} = 2 + \frac{1}{x}$

$x = 2x(x-1) + (x-1)$ — M1

$2x^2 - 2x - 1 = 0$ — A1

$x = \frac{2 \pm \sqrt{4+8}}{4}$ — M1

$x = \frac{2 \pm 2\sqrt{3}}{4}$ — M1

$x = \frac{1}{2} \pm \frac{1}{2}\sqrt{3}$ — A1 **(10)**

---

9. *(a)* $S_6 = \frac{6}{2}[3000 + (5 \times -x)] = 8100$ — M1 A1

$3000 - 5x = 2700, \quad x = 60$ — M1 A1

(b) $= 1500 - (7 \times 60) = 1500 - 420 = £1080$ — M1 A1

(c) $S_n = \frac{n}{2}[3000 - 60(n-1)]$ — M1

$= n[1500 - 30(n-1)]$

$= 30n[50 - (n-1)] = 30n(51 - n) \qquad [\, k = 30 \,]$ — M1 A1

(d) the value of sales in a month would become negative which is not possible — B1 **(10)**

---

10. *(a)* $y = \int (3x^2 + 4x + k)\ dx$

$y = x^3 + 2x^2 + kx + c$ — M1 A2

$(0, -2) \ \therefore c = -2$ — B1

$(2, 18) \ \therefore 18 = 8 + 8 + 2k - 2$ — M1

$k = 2$ — A1

$y = x^3 + 2x^2 + 2x - 2$ — A1

(b) $x^3 + 2x^2 + 2x - 2 = x - 2$

$x^3 + 2x^2 + x = 0$

$x(x^2 + 2x + 1) = 0$ — M1

$x(x+1)^2 = 0$ — M1

repeated root $\therefore$ tangent — A1

point of contact where $x = -1$ — M1

$\therefore \ (-1, -3)$ — A1 **(12)**

Total **(75)**