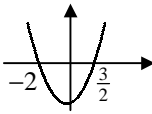
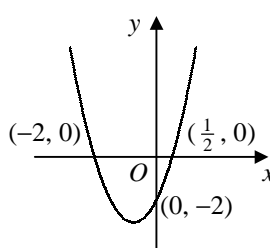
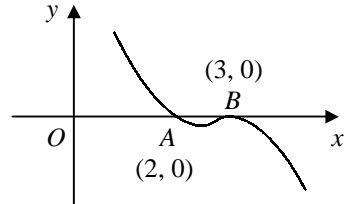


C1 Paper I – Marking Guide

1. $2x^2 + x - 6 \leq 0$
 $(2x - 3)(x + 2) \leq 0$
critical values: $-2, \frac{3}{2}$
 $-2 \leq x \leq \frac{3}{2}$
- 
- M1
A1
M1
A1 (4)
-
2. $= 6x - \frac{1}{2}x^{-\frac{1}{2}} - \frac{1}{2}x^{-2}$
- M1 A3 (4)
-
3. $x = 0 \Rightarrow y = -6 \quad \therefore (0, -6)$
 $y = 0 \Rightarrow x = 12 \quad \therefore (12, 0)$
mid-point = $(\frac{0+12}{2}, \frac{-6+0}{2}) = (6, -3)$
dist. from $O = \sqrt{6^2 + (-3)^2} = \sqrt{36+9} = \sqrt{45}$
 $= \sqrt{9 \times 5} = 3\sqrt{5}$
- B1
M1 A1
M1
M1 A1 (6)
-
4. (i) $(x+k)^2 - k^2 + 4 = 0$
 $(x+k)^2 = k^2 - 4$
 $x+k = \pm\sqrt{k^2 - 4}$
 $x = -k \pm\sqrt{k^2 - 4}$
- (ii) $k = 3$
 $\therefore x = -3 \pm\sqrt{3^2 - 4}$
 $= -3 \pm\sqrt{5}$
- M1
A1
M1
A1
M1
A1 (6)
-
5. $x = 2 \therefore y = \sqrt{16} = 4$
 $y = \sqrt{8}\sqrt{x} = 2\sqrt{2}x^{\frac{1}{2}}$
 $\frac{dy}{dx} = \sqrt{2}x^{-\frac{1}{2}}$
grad = $\frac{\sqrt{2}}{\sqrt{2}} = 1$
 $\therefore y - 4 = 1(x - 2) \quad [y = x + 2]$
- B1
M1 A1
M1
M1 A1 (6)
-
6. (i) $= 3\sqrt{3} - \frac{8}{\sqrt{3}} = 3\sqrt{3} - \frac{8}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$
 $= 3\sqrt{3} - \frac{8}{3}\sqrt{3} = \frac{1}{3}\sqrt{3}$
- (ii) $x^{\frac{3}{2}} = 8x^{-\frac{1}{2}}$
 $x^2 = 8$
 $x = \pm\sqrt{8} = \pm 2\sqrt{2}$
- B1 M1
A1
M1 A1
M1 A1 (7)
-
7. $x - 3y + 7 = 0 \Rightarrow x = 3y - 7$
sub. into $x^2 + 2xy - y^2 = 7$
 $(3y - 7)^2 + 2y(3y - 7) - y^2 = 7$
 $y^2 - 4y + 3 = 0$
 $(y - 1)(y - 3) = 0$
 $y = 1, 3$
 $\therefore x = -4, y = 1$ or $x = 2, y = 3$
- M1
M1
A1
M1
A1
M1 A1 (7)
-

8. (i) $(x-1)^2 - 1 + (y-9)^2 - 81 + 73 = 0$ M1
 $(x-1)^2 + (y-9)^2 = 9$
 \therefore centre $(1, 9)$, radius = 3 A2
- (ii) grad of line = 2 M1
 perp. grad = $-\frac{1}{2} = -\frac{1}{2}$
 eqn of line through centre of circle, perp. to straight line: M1
 $y - 9 = -\frac{1}{2}(x - 1)$
 $y = \frac{19}{2} - \frac{1}{2}x$ A1
 closest point where lines intersect
 $\therefore 2x - 3 = \frac{19}{2} - \frac{1}{2}x$ M1
 $x = 5$ A1
 $\therefore (5, 7)$ A1 (9)

9. (i) $(2x-1)(x+2) = 0$ M1
 $x = -2, \frac{1}{2}$ A1
- (ii)  B2
- (iii) $(0, -2),$ B1
 $(-4, 0), (1, 0)$ M1 A1
- (iv) $f(x-1) = 2(x-1)^2 + 3(x-1) - 2$ M1 A1
 $= 2x^2 - x - 3$
 $\therefore a = 2, b = -1, c = -3$ A1 (10)

10. (i)  B3
- (ii) $y = (2-x)(9-6x+x^2)$ M1
 $y = 18 - 12x + 2x^2 - 9x + 6x^2 - x^3$ A1
 $y = 18 - 21x + 8x^2 - x^3$
 $\frac{dy}{dx} = -21 + 16x - 3x^2$ M1 A1
 grad = $-21 + 32 - 12 = -1$
 $\therefore y - 0 = -(x - 2)$ M1
 $x + y = 2$ A1
- (iii) $-21 + 16x - 3x^2 = 0$ M1
 $-(3x-7)(x-3) = 0$ M1
 $x = 3$ (at B), $\frac{7}{3}$ A1
 $y = (-\frac{1}{3})(\frac{7}{3})^2 = -\frac{49}{27} \therefore (\frac{7}{3}, -\frac{49}{27})$ A1 (13)

Total (72)