Mark Scheme 4752
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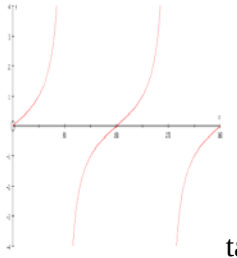
Section A

1	7/9 or 140/180 o.e.	2	B1 for 180° = π rad o.e. or 0.78 or other approximations	2
2	224	2	M1 for $2^3 + 3^3 + 4^3 + 5^3$	2
3	triangle divided into 2 rt angled tris $\sqrt{3}$ and 1 indicated 60 indicated	H1 S1 A1		3
4	16.1  overestimate + expn eg sketch	4 1	M3 for ¼{8.2 + 4.2 + 2 (6.4 + 5.5 + 5 + 4.7 + 4.4)} M2 for one slip/error M1 for two slips/errors	5
5	(i)  tan x = ¾ (ii) 36.8 to 36.9 and 216.8 to 216.9	2 M1 A1A1	no numbers required on axes unless more branches shown. G1 for a correct first sweep Allow 37, 217	5
6	$y'' = 2x - 6$ $y'' = 0$ at $x = 3$ $y' = 0$ at $x = 3$ showing y' does not change sign	B1 B1 B1 E1	 or that y'' changes sign	4
7	(i) 5 (ii) 5.646... to 2 sf or more	2 3	M1 for 6 = 1.2r M2 for 2 x 5x sin 0.6 or $\sqrt{(5^2 + 5^2 - 2.5.5.\cos 1.2)}$ or 5 sin 1.2/sin 0.971 M1 for these methods with 1 error	5
8	$\frac{2}{3}x^{\frac{3}{2}} - 3x^{-2} + c$ o.e.	5	1 for each element	5
9	(i) $\log_{10} y = 0.5x + 3$ (ii) $y = 10^{0.5x+3}$ isw	B3 2	B1 for each term scored in either part o.e. e.g. $y = 1000 \times 10^{\sqrt{x}}$	5

Section B

10	**i**	$y' = 6 - 2x$ $y' = 0$ used $x = 3$ $y = 16$ (0, 7) (–1, 0) and (7,0) found or marked on graph sketch of correct shape	M1 M1 A1 A1 3 1	condone one error 1 each must reach pos. y - axis	 8
	ii	58.6 to 58.7	3 M1	B1 for $7x + 3x^2 - x^3/3$ [their value at 5] – [their value at 1] dependent on integration attempted	3
	iii	using his (ii) and 48	1		1
11	**i**	$3x^2 - 6$	2	1 if one error	2
	ii	$-\sqrt{2} < x < \sqrt{2}$	3	M1 for using their $y' = 0$ B1 f.t. for both roots found	3
	iii	subst $x = -1$ in their y' [=–3] $y = 7$ when $x = -1$ $y + 3x = 4$ $x^3 - 6x + 2 = -3x + 4$ (2, –2) c.a.o.	B1 M1 A1 M1 A1,A1	f.t. f.t. 3 terms f.t.	 6
12	**i**	A 23 B 24 C 480	2 2 2	M1 for 5, 7, 9 etc or AP with $a = 5$, $d = 2$ M1 for $51 = 5 + 2(n - 1)$ o.e. M1 for attempted use of sum of AP formula eg 20/2[10+19×2]	2 2 2
	ii	A 11.78 – 11.80 B $5 \times 1.1^{n-1} > 50$ $1.1^{n-1} > 10$ $(n - 1) \log 1.1 > 1$ $n - 1 > 1/\log 1.1$ n = 26	2 B1 B1 L1 A1 1	 Or other step towards completion (NB answer given) independent	