1	**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

2	$6x^5 + \frac{1}{2}x^{-\frac{1}{2}}$ o.e.	B1 B1 B1	$6x^5$ $x^{\frac{1}{2}}$ soi $\frac{1}{2}x^{-\frac{1}{2}}$ isw	3

3	**(i)**	$\frac{dy}{dx} = 4x^3$ when $x = 2$, $\frac{dy}{dx} = 32$ s.o.i. when $x = 2$, $y = 16$ s.o.i. $y = 32x - 48$ c.a.o.	**M1** **A1** **B1** **A1**	 i.s.w.
3	**(i i**	34.481	**2**	**M1** for $\frac{2.1^4 - 2^4}{0.1}$
	(ii i (*A*)	$16 + 32h + 24h^2 + 8h^3 + h^4$ c.a.o.	**3**	**B2** for 4 terms correct **B1** for 3 terms correct
	(ii i (*B*)	$32 + 24h + 8h^2 + h^3$ or ft	**2**	**B1** if one error
	(ii i (*C*)	as $h \to 0$, result $\to$ their 32 from (iii) gradient of tangent is limit of gradient of chord	**1** **1**	

4	**i**	6.1		M1 for $\dfrac{(3.1^2-7)-(3^2-7)}{3.1-3}$ o.	2
	ii	$\dfrac{((3+h)^2-7)-(3^2-7)}{h}$	M1	s.o.	
		numerator = $6h + h^2$	M1		
		$6 + h$	A1		3
	iii	as h tends to 0,	M1		
		grad. tends to 6 o.e. f.t.from "6"+h	A1		2
	iv	$y - 2 =$ "6" $(x - 3)$ o.e.	M1		
		$y = 6x - 16$	A1	6 may be obtained from [illegible]	2
	v	At P, $x = 16/6$ o.e. or ft	M1		
		At Q, $x = \sqrt{7}$	M1		
		0.021 cao	A1		3

5	**iA**	$x^4 = 8x$	M1		
		(2, 16) c.a.o.	A1		
		PQ = 16 and completion to show ½ × 2 × 16 = 16	A1	NB answer 16 given	3
	iB	$x^5/5$	M1		
		evaluating their integral at their co-ord of P and zero [or 32/5 o.e.]	M1	ft only if integral attempted, not for x^4 or differentiation	
		9.6 o.e.	A1	c.a.	3
	iiA	$6x^2h^2 + 4xh^3 + h^4$	2	B1 for two terms correct.	2
	iiB	$4x^3 + 6x^2h + 4xh^2 + h^3$	2	B1 for three terms correct	2
	iiC	$4x^3$	1		1
	iiD	gradient of [tangent to] curve	1		1