Question Number	Scheme	Marks
2.	$y = 3x^5 + 4x^3 - x + 5 \Rightarrow \left(\frac{dy}{dx} =\right) 15x^4 + 12x^2 - 1$	M1 A1
	$15x^4 + 12x^2 - 1 = 2 \Rightarrow 15x^4 + 12x^2 - 3 = 0$	dM1
	$\Rightarrow 3(5x^2 - 1)(x^2 + 1) = 0$ o.e	ddM1
	$\Rightarrow x = \pm\frac{1}{\sqrt{5}}$ o.e.	A1
		(5)
		(5 marks)

Question Number	Scheme	Marks
1.	$\int (2x-5)(3x+2)(2x+5)\,dx$	
	$(2x-5)(3x+2)(2x+5) = (6x^2 - 11x - 10)(2x+5) = \ldots$	M1
	$= 12x^3 + 8x^2 - 75x - 50$	A1
	$\int (2x-5)(3x+2)(2x+5)\,dx = 3x^4 + \frac{8}{3}x^3 - \frac{75}{2}x^2 - 50x + c$	M1, A1ft, A1
		(5 marks)

Question	Answer	Marks	Guidance
8(a)	$\left[\frac{dy}{dx} =\right] \frac{1}{2}x^{-1/2} - 2x^{-3/2}$	**B1 B1**	Allow unsimplified versions.
	At $x = 1$, $\frac{dy}{dx} = \frac{1}{2} - 2 = -\frac{3}{2}$	**M1**	Substitute $x = 1$ into a differentiated y.
	Equation of tangent is $y - 5 = -\frac{3}{2}(x-1)$	**A1**	WWW Or $y = -\frac{3}{2}x + \frac{13}{2}$.
		4	

Question Number	Scheme	Marks
8 (a) (i)	$x=4, \mathrm{f}'(x)=10,\ \mathrm{f}'(x)=3\sqrt{x}+kx^2 \Rightarrow 10=3\sqrt{4}+4^2k \Rightarrow k=\ldots$	M1
	$10=3\times 2+k\times 16 \Rightarrow k=\dfrac{1}{4}$ *	A1*
(ii)	$x=4, y=12$ on $y=10x+c \Rightarrow 12=10\times 4+c$	M1
	$\Rightarrow c=-28$	A1
		(4)
(b)	$\mathrm{f}''(x)=\dfrac{3}{2}x^{-\frac{1}{2}}+\dfrac{1}{2}x$	M1 A1ft
	$\{\Rightarrow \mathrm{f}''(4)\}=\dfrac{11}{4}$	A1
		(3)
(c)	$\mathrm{f}(x)=2x^{\frac{3}{2}}+\dfrac{1}{12}x^3+d$	M1, A1ft
	Uses $P(4,12) \Rightarrow 12=2\times 8+\dfrac{1}{12}\times 4^3+d \Rightarrow d=\ldots$	dM1
	$\{\mathrm{f}(x)=\}\ 2x^{\frac{3}{2}}+\dfrac{1}{12}x^3-\dfrac{28}{3}$	A1
		(4)
		(11 marks)