Question Number	Scheme	Marks
1.	$\int\left(\frac{8}{3}x^3-\frac{1}{2}x^{-\frac{1}{2}}-5\right)dx=\frac{8}{3}\times\frac{x^4}{4}-\frac{1}{2}\times 2x^{\frac{1}{2}}-5x+c$	M1 A1
	$=\frac{2}{3}x^4-x^{\frac{1}{2}}-5x+c$	A1 A1 **(4 marks)**

Question Number	Scheme	Marks
7. (a)	$2x-3\sqrt{x}-5=9\Rightarrow 2x-3\sqrt{x}-14=0$ and treats as quadratic equation	M1
	$\Rightarrow\left(2\sqrt{x}-7\right)\left(\sqrt{x}+2\right)=0\Rightarrow\left(\sqrt{x}=\right)\frac{7}{2},(-2)$	A1
	$\Rightarrow x=\left(\frac{7}{2}\right)^2=\frac{49}{4}$	dM1 A1 **(4)**
(b)	$\left(f'(x)=\right)\ 2-\frac{3}{2}x^{-\frac{1}{2}}$	B1

Question Number	Scheme	Marks
	$\left(f''(x)=\right)\ \frac{3}{4}x^{-\frac{3}{2}}$	M1 A1
	Attempts $\frac{3}{4}x^{-\frac{3}{2}}=6\Rightarrow x^{-\frac{3}{2}}=8\Rightarrow x=\frac{1}{4}$	dM1 A1 **(5)** **(9 marks)**

Question Number	Scheme	Marks
10 (a)	$f(x) \leqslant 0 \Rightarrow \quad x \leqslant -\frac{5}{2}, \quad x = 3$	M1 A1

Question Number	Scheme	Marks
		(2)
(b)	$f(x) = (2x+5)(x-3)^2 = (2x+5)\left(x^2 - 6x + 9\right)$	M1
	$= 2x^3 - 12x^2 + 18x + 5x^2 - 30x + 45$	M1
	$= 2x^3 - 7x^2 - 12x + 45$	A1
		(3)
(c)	(i) $P(0,45)$	B1ft
	(ii) Gradient $= -12$	B1ft
		(2)
(d)	(i) $g(x) = \left(2(x-2)+5\right)(x-2-3)^2 = (2x+1)(x-5)^2$	M1 A1
	(ii) 25	B1
		(3)
		(10 marks)

Question	Scheme	Marks
7(a)(i)	$f(x) = 2x^3 - kx^2 + 14x + 24 \Rightarrow \left(f'(x) =\right) 6x^2 - 2kx + 14$	M1A1
	$\left(f''(x) =\right) 12x - 2k$	A1ft
(ii)		**(3)**
(b)	$6x^2 - 2kx + 14 = 12x - 2k \Rightarrow 6(5)^2 - 2k(5) + 14 = 12(5) - 2k \Rightarrow k = \ldots$	M1
	$k = 13$	A1
		(2)
(c)	$k = 13 \Rightarrow 6x^2 - 38x + 40 = 0 \Rightarrow x = \ldots$	M1
	$x = "\frac{4}{3}" \Rightarrow y = 12\left("\frac{4}{3}"\right) - 2 \times 13$ or $y = 6\left("\frac{4}{3}"\right)^2 - 2 \times 13 \times \left("\frac{4}{3}"\right) + 14$	M1
	$x = \frac{4}{3}, \ y = -10$	A1
		(3)
		Total 8