1	**EITHER:**	State or imply non-modular inequality $(x+1)^2 > (x-4)^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical value $\frac{3}{2}$	A1	
		State correct answer $x > \frac{3}{2}$	A1	
	OR:	State a correct linear equation for the critical value, e.g. $x+1 = -x+4$, or corresponding correct linear inequality, e.g. $x+1 > -(x-4)$	M1	
		Obtain critical value $\frac{3}{2}$	A1	
		State correct answer $x > \frac{3}{2}$	A1	[3]

2	Use law for the logarithm of a product, a quotient or a power	M1*	
	Obtain $x\log 5 = (2x+1)\log 2$, or equivalent	A1	
	Solve for x, via correct manipulative technique(s)	M1(dep*)	
	Obtain answer $x = 3.11$. Allow $x \in [3.10, 3.11]$	A1	[4]

3	Integrate and obtain $\frac{1}{2}e^{2x}$ term	B1	
	Obtain $2e^{x}$ term	B1	
	Obtain x	B1	
	Use limits correctly, allow use of limits $x = 1$ and $x = 0$ into an incorrect form	M1	
	Obtain given answer	A1	[5]
	S. R. Feeding limits into original <u>integrand</u>, 0/5		

4	**(i)**	State $\frac{dx}{dt} = \frac{1}{t-2}$ or $\frac{dy}{dt} = 1 - 9t^{-2}$	B1	
		Use $\frac{dy}{dx} = \frac{dy}{dt} \div \frac{dx}{dt}$	M1	
		Obtain given answer correctly	A1	[3]
	(ii)	Equate derivative to zero and solve for t	M1	
		State or imply that $t = 3$ is admissible c.w.o., and note $t = -3$, 2 cases	A1	
		Obtain coordinates (1, 6) and no others	A1	[3]

5	Use correct trig identity to obtain a quadratic in $\cot\theta$ or $\tan\theta$	M1	
	Solve the quadratic correctly	A1	
	Obtain $\tan\theta = \frac{1}{2}$ or $-\frac{2}{3}$	A1√	
	Obtain answer 26.6° or 146.3°	A1	
	Carry out correct method for second answer from either root	M1	
	Obtain remaining 3 answers from 26.6°, 146.3°, 206.6°, 326.3° and no others in the range	A1	[6]
	[Ignore answers outside the given range]		

6	(i)	Consider sign of $\frac{6}{x^2} - x - 1$ at $x = 1.4$ and $x = 1.6$, or equivalent	M1	
		Complete the argument correctly with appropriate calculations	A1	[2]
	(ii)	State $\frac{6}{x^2} = x + 1$	B1	
		Rearrange equation to given equation or *vice versa*	B1	[2]
	(iii)	Use the iterative formula correctly at least once	M1	
		Obtain final answer 1.54	A1	
		Show sufficient iterations to justify its accuracy to 2 d.p. or show there is a sign change in the interval (1.535, 1.545)	B1	[3]
7	(i)	Substitute $x = 1$, equate to zero and obtain a correct equation in any form	B1	
		Substitute $x = 2$ and equate to 10	M1	
		Obtain a correct equation in any form	A1	
		Solve a relevant pair of equations for a or for b	M1	
		Obtain $a = -17$ and $b = 12$	A1	[5]
	(ii)	At any stage, state that $x = 1$ is a solution	B1	
		EITHER: Attempt division by $x - 1$ and reach a partial quotient of $3x^2 + 5x$	M1	
		Obtain quotient $3x^2 + 5x - 12$	A1	
		Obtain solutions $x = -3$ and $x = \frac{4}{3}$	A1	
		OR: Obtain solution $x = -3$ by trial and error or inspection	B1	
		Obtain solution $x = \frac{4}{3}$	B2	
		[If an attempt at the quadratic factor is made by inspection, the M1 is earned if it reaches an unknown factor of $3x^2 + 5x + \lambda$ and an equation in λ]		[4]
8	(i)	Use product rule	M1	
		Obtain correct derivative in any form	A1	
		Substitute $x = \frac{1}{2}\pi$, and obtain gradient of –1 for normal	A1√	
		from $y' = \sin x - x\cos x$ ONLY		
		Show that line through $\left(\frac{1}{2}\pi, \frac{1}{2}\pi\right)$ with gradient –1 passes through $(\pi, 0)$	M1	
			A1	[5]
	(ii)	Differentiate $\sin x$ and use product rule to differentiate $x\cos x$	M1	
		Obtain $x\sin x$, or equivalent	A1	[2]
	(iii)	State that integral is $\sin x - x\cos x(+c)$	B1	
		Substitute limits 0 and $\frac{\pi}{2}$ correctly	M1	
		Obtain answer 1	A1	[3]
		S. R. Feeding limits into original <u>integrand</u>, 0/3		