1		Integrate and obtain term of the form $k \ln(7-2x)$	M1	
		State $y = -2\ln(7-2x)(+c)$	A1	
		Evaluate c	DM1	
		Obtain answer $y = -2\ln(7-2x) + 2$	A1√	[4]
2	Either	State or imply non-modular inequality $(x-8)^2 > (2x-4)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a quadratic, or solve two linear equations	M1	
		Obtain critical values 4 and –4	A1	
		State correct answer $-4 < x < 4$	A1	
	Or	Obtain one critical value, e.g. $x = 4$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		Obtain the other critical value similarly	B2	
		State correct answer $-4 < x < 4$	B1	[4]
3	**(i)**	Substitute $x = -1$ and equate to zero	M1	
		Obtain answer $a = 7$	A1	[2]
	(ii)	Substitute $x = -3$ and evaluate expression	M1	
		Obtain answer 18	A1	[2]
4	**(i)**	State or imply $(y+1)\log 5 = 3x\log 2$	M1	
		State that this is of the form $ay = bx + c$ and thus a straight line, or equivalent	A1	[2]
	(ii)	State gradient is $\frac{3\ln 2}{\ln 5}$, or equivalent, e.g. $3\log_5 2$	B1	
		State (0, –1)	B1	[2]
5	**(i)**	State $3\frac{dy}{dx}$ as derivative of $3y$, or equivalent	B1	
		State $4xy + 2x^2\frac{dy}{dx}$ as a derivative of $2x^2y$, or equivalent	B1	
		Equate derivative of LHS to zero and solve for $\frac{dy}{dx}$	M1	
		Obtain given answer correctly	A1	[4]
	(ii)	Substitute $x = 2$ into given equation and solve for y	M1	
		Obtain gradient = $\frac{12}{5}$ correctly	A1	
		Form equation of the normal at their point, using negative recip of their $\frac{dy}{dx}$	M1	
		State correct equation of normal $5x + 12y + 2 = 0$ or equivalent	A1	[4]
6	**(i)**	Make a recognisable sketch of a relevant graph, e.g. $y = 3e^x$ or $y = 8 - 2x$	B1	
		Sketch a second relevant graph and justify the given statement	B1	[2]

	(ii)	Consider sign of $3e^x - 8 + 2x$ at $x = 0.7$ and $x = 0.8$, or equivalent	M1	
		Complete the argument correctly with appropriate calculations	A1	[2]
		($f(0.7) = -0.559$, $f(0.8) = 0.277$ or equivalent)		
	(iii)	Show that given equation is equivalent to $x = \ln\left(\frac{8-2x}{3}\right)$, or vice versa	B1	[1]
	(iv)	Use the iterative formula correctly at least once	M1	
		Obtain final answer 0.768	A1	
		Show sufficient iterations to justify its accuracy to 3 d.p.		

$x_0 = 0.7$	$x_0 = 0.75$	$x_0 = 0.8$
0.78846	0.77319	0.75769
0.76129	0.76603	0.77082
0.76971	0.76825	0.76676
0.76711	0.76756	0.76802
0.76791		0.76763
0.76766		

		or show there is a sign change in the interval (0.7675, 0.7685)	B1	[3]
7	**(a)**	Obtain one term of form ke^{2x-1} with any non-zero k	M1	
		Obtain correct integral $x + \frac{1}{2}e^{2x-1}$	A1	
		Substitute limits, giving exact values	M1	
		Correct answer $\frac{1}{2}e^3 + 1$	A1	[4]
	(b)	Use product or quotient rule	M1*	
		Obtain correct derivative in any form	A1	
		Equate derivative to zero and solve for x	M1* dep	
		Obtain $\tan 2x = 1$	A1	
		Obtain $x = \frac{\pi}{8}$	A1	[5]
8	**(i)**	Use correct $\sin(A-B)$ and $\cos(A-B)$ formula	M1	
		Substitute exact values for $\cos 30°$ etc.	M1	
		Obtain given answer correctly	A1	[3]
	(ii)	State $2\operatorname{cosec} x = 3\cot^2 x - 2$	B1	
		Use $\cot^2 x = \operatorname{cosec}^2 x - 1$	M1	
		Attempt solution of quadratic equation in cosec x or sin x	M1	
		($3\operatorname{cosec}^2 x - 2\operatorname{cosec} x - 5 = 0$ or $5\sin^2 x = 2\sin x - 3 = 0$)		
		Obtain $\sin x = \frac{3}{5}$ or -1	A1√	
		Obtain one correct answer for $\sin^{-1}\left(\frac{3}{5}\right)$	A1	
		Obtain remaining 2 answers from 36.9°, 143.1°, 270° and no others in the range	A1	[6]
		[Ignore answers outside the given range]		
		SC If only answer given is 270°	B1	