6 (a)	$y=\dfrac{4x+3}{x-2} \Rightarrow yx-2y=4x+3$ $\Rightarrow yx-4x=2y+3$	$y=4+\dfrac{11}{x-2} \Rightarrow y-4=\dfrac{11}{x-2}$ $x-2=\dfrac{11}{y-4}$	M1
	$\Rightarrow x=\dfrac{2y+3}{y-4} \Rightarrow \mathrm{f}^{-1}(x)=\dfrac{2x+3}{x-4}$	$\Rightarrow x=2+\dfrac{11}{y-4} \Rightarrow \mathrm{f}^{-1}(x)=2+\dfrac{11}{x-4}$	A1
	$x \neq 4$		B1
			(3)
(b)	$\mathrm{ff}(x)=\dfrac{4\times\dfrac{4x+3}{x-2}+3}{\dfrac{4x+3}{x-2}-2}$ or $\mathrm{ff}(x)=4+\dfrac{11}{4+\dfrac{11}{x-2}-2}$		M1
	$=\dfrac{4\times(4x+3)+3(x-2)}{4x+3-2(x-2)}=\dfrac{19x+6}{2x+7}$		dM1 A1
			(3)
(c)	Either $x=1$ or $y=38$		M1
	$(1, 38)$		A1
			(2)
			(8 marks)

7.(a)	States or implies that $A=2\,500$	B1
	$10000=2500\mathrm{e}^{k\times8} \Rightarrow 8k=\ln 4 \Rightarrow k=\ldots$	M1
	$\Rightarrow k=\dfrac{1}{8}\ln 4$ or awrt 0.1733	A1
		(3)
(b)	$\dfrac{\mathrm{d}N}{\mathrm{d}t}=60000\times-0.6\mathrm{e}^{-0.6\times5}=-1792$ So decrease is 1790	M1, A1
		(2)
(c)	$60000\mathrm{e}^{-0.6t}=2500\mathrm{e}^{0.1733t}$	M1
	$24=\mathrm{e}^{0.1733t+0.6t} \Rightarrow 0.1733t+0.6t=\ln 24 \Rightarrow t=\ldots$	dM1
	$T=4.11$	A1
		(3)
		8 marks

8(a)	Starting with the LHS: $2\mathrm{cosec}^2 2\theta(1-\cos 2\theta)=\dfrac{2-2\cos 2\theta}{\sin^2 2\theta}$	M1
	$=\dfrac{2-2(1-2\sin^2\theta)}{4\sin^2\theta\cos^2\theta}$	M1dM1
	$=\sec^2\theta=1+\tan^2\theta\equiv\text{RHS}$ *	A1*
		(4)
(b)	$\sec^2 x-3\sec x-4=0 \Rightarrow \sec x=\ldots$	M1
	$\cos x=\dfrac{1}{4}$ (ignore -1)	A1
	$\cos x=\dfrac{1}{4} \Rightarrow x=\ldots$	dM1
	$x=75.5°, 284.5°$	A1
		(4)
		(8 marks)

Question Number	Scheme	Marks
8(a)	$25 = a + -(5\times -2+b)\ (\Rightarrow 25 = a+10-b) \Rightarrow a = 15+b$ *	M1A1*
		(2)
(b)	$9 = a+10+b \Rightarrow a = \ldots$ or $b = \ldots.$	M1
	$a = 7,\ b = -8$	A1A1
		(3)
(c)	$\left(\frac{8}{5}, 7\right)$	B1ftB1
		(2)
(d)	$15-5x = -2x^3+5x^2+4x-3 \Rightarrow 2x^3-5x^2-9x+18 = 0$	M1
	$2x^3-5x^2-9x+18 = (x+2)(2x^2-9x+9)$	dM1A1
	$2x^2-9x+9 = 0 \Rightarrow x = \frac{3}{2}$ (ignore $x=3$)	ddM1
	$\left(\frac{3}{2}, \frac{15}{2}\right)$	M1A1
		(6)
		(13 marks)

9(a)	$k = -1$	B1
		(1)
(b)(i)	$f(0) = \lvert 2-4\ln(0+1)\rvert = 2-0 = 2$	B1
(ii)	$0 = 2-4\ln(x+1) \Rightarrow \ln(x+1) = \frac{1}{2} \Rightarrow x = e^p+q$	M1
	$x = e^{\frac{1}{2}}-1$	A1
		(3)
(c)	$2-4\ln(x+1) = 3 \Rightarrow \ln(x+1) = \ldots$ or $-2+4\ln(x+1) = 3 \Rightarrow \ln(x+1) = \ldots$	M1
	$2-4\ln(x+1) = 3 \Rightarrow x = \ldots$ and $-2+4\ln(x+1) = 3 \Rightarrow x = \ldots$	dM1
	CVs $e^{-\frac{1}{4}}-1,\ e^{\frac{5}{4}}-1$	A1
	"-1" $< x < e^{-\frac{1}{4}}-1$ or $x > e^{\frac{5}{4}}-1$	ddM1A1ft
		(5)
		(9 marks)