1	$3\tan^2\theta+7\sec\theta-3=0\Rightarrow 3\left(\sec^2\theta-1\right)+7\sec\theta-3=0$	M1
	$3\sec^2\theta+7\sec\theta-6=0$	A1
	$(3\sec\theta-2)(\sec\theta+3)=0\Rightarrow\sec\theta=...\Rightarrow\cos\theta=...$	dM1
	$\theta=109.5°, 250.5°$	A1, A1
		(5)

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

4.(a)	$x^2+0x+1\overline{)3x^3-5x^2+7x-5}$ $\quad 3x-5$ $3x^3+0x^2+3x$ $-5x^2+4x$ $-5x^2+0x-5$ $4x$	M1
	$\underline{A=3}$, $B=-5, C=4$	$\underline{B1}$, A1
	$D=0$ *	A1*
		(4)
(b)	$\int 3x-5+\frac{4x}{x^2+1}\,dx=\frac{3x^2}{2}-5x+2\ln(x^2+1)+c$	M1, A1ft
	Area $=\left(\frac{3\times3^2}{2}-5\times3+2\ln(3^2+1)\right)-\left(\frac{3\times2^2}{2}-5\times2+2\ln(2^2+1)\right)$	
	$=\frac{5}{2}+\ln 4$	dM1, A1
		(4)
		(8 marks)

10(a)(i)	$(y=)10+k$	B1
(ii)	$x=\frac{10}{k}$ **or** $y=k$	B1
	$x=\frac{10}{k}$ **and** $y=k$	B1
		(3)

(b)	$kx-10+k=2k\Rightarrow x=...$ **or** $-kx+10+k=2k\Rightarrow x=...$	M1
	$kx-10+k=2k\Rightarrow x=...$ **and** $-kx+10+k=2k\Rightarrow x=...$	dM1
	$x \text{ „ } \frac{10-k}{k}$ or $x \ldots \frac{10+k}{k}$ oe	A1
		(3)

(c)	$k>3$	B1
	Maximum value of k occurs when $y=3x+1$ passes through vertex e.g. when $"k"=3\times"\frac{10}{k}"+1\Rightarrow k=...$ **See below for alternative approaches.**	M1
	$k^2-k-30=0\Rightarrow(k+5)(k-6)=0\Rightarrow k=6$ So **maximum** k is 6	A1
	$3<k<6$	A1
		(4)
		Total 10

7 (a)	$\sqrt{2}\sin(x+45°)=\cos(x-60°)$	
	$\sqrt{2}(\sin x\cos 45°+\cos x\sin 45°)=\cos x\cos 60°+\sin x\sin 60°$	M1 A1
	$\sin x+\cos x=\frac{1}{2}\cos x+\frac{\sqrt{3}}{2}\sin x$	
	$\cos x=(\sqrt{3}-2)\sin x$	M1
	$\tan x\left(=\frac{1}{\sqrt{3}-2}=\frac{\sqrt{3}+2}{-1}\right)=-2-\sqrt{3}$ *	A1*
		(4)
(b)	States or uses $x+45°=2\theta$ o.e.	B1
	Proceeds from e.g. $\tan(2\theta-45°)=-2-\sqrt{3}\Rightarrow 2\theta-45°=105°,285°$	M1
	Correct order of operations to find one angle	dM1
	$\theta=75°,165°$	A1
		(4)

6.(a)	$(2,-10)$	B1 B1
		(2)
(b)	$ff(0)=f(-4)=...$	M1
	$=8$	A1cso
		(2)
(c)	Attempts to solve $-3(x-2)-10=5x+10\Rightarrow x=...$	M1
	$x>-\frac{7}{4}$ only	A1
		(2)
(d)	$x\left(\text{or } \lvert x\rvert\right)=\frac{16}{3}$	B1
	Attempts $3(\lvert x\rvert-2)-10=0\Rightarrow\lvert x\rvert=k,\ k>0$	
	or $3(-x-2)-10=0\Rightarrow x=-k$	M1
	or $3(x-2)-10=0\Rightarrow x=k\Rightarrow x=-k$	
	$x=\left(\frac{16}{3}\text{ and }\right)-\frac{16}{3}$ with no other values	A1
		(3)
		(9 marks)