5(i)	$\cos 6x = 1 - 2\sin^2 3x \Rightarrow \sin^2 3x = \frac{1}{2} - \frac{1}{2}\cos 6x$ $\int \sin^2 3x \, dx = \int \left(\frac{1}{2} - \frac{1}{2}\cos 6x\right) dx$	M1
	$= \frac{1}{2}x - \frac{1}{12}\sin 6x \, (+c)$	A1
		(2)
(ii)	$\int x\left(x^2+4\right)^{\frac{3}{2}} dx = \frac{1}{5}\left(x^2+4\right)^{\frac{5}{2}} (+c)$	M1A1
		(2)
		Total 4

3(a)	$(\cos 2A \equiv) \cos A \cos A - \sin A \sin A \equiv \cos^2 A - (1 - \cos^2 A)$	M1
	$\Rightarrow \cos 2A \equiv 2\cos^2 A - 1 \quad *$	A1*
		(2)
(b)	$\int (3 - 2\cos 6x) \, dx = 3x - \frac{\sin 6x}{3} \quad (+c)$	M1A1
	$\left[3x - \frac{\sin 6x}{3}\right]_{\frac{\pi}{12}}^{\frac{\pi}{8}} = \left(3\left(\frac{\pi}{8}\right) - \frac{\sin\left(6 \times \frac{\pi}{8}\right)}{3}\right) - \left(3\left(\frac{\pi}{12}\right) - \frac{\sin\left(6 \times \frac{\pi}{12}\right)}{3}\right) = \frac{1}{8}\pi + \frac{2-\sqrt{2}}{6}$	dM1A1
		(4)
		(6 marks)

3 (i)	$\frac{d}{dx}\ln\left(\sin^2 3x\right) = \frac{1}{\sin^{\cancel{2}} 3x} \times 2\cancel{\sin 3x} \times 3\cos 3x = 6\cot 3x$	M1 A1 **(2)**
(ii) (a)	$\frac{d}{dx}\left(3x^2-4\right)^6 = 36x\left(3x^2-4\right)^5$	M1 A1 **(2)**
(b)	$\int x\left(3x^2-4\right)^5 dx = \frac{1}{36}\left(3x^2-4\right)^6$	B1ft
	$\int_0^{\sqrt{2}} x\left(3x^2-4\right)^5 dx = \left[\frac{1}{36}\left(3x^2-4\right)^6\right]_0^{\sqrt{2}} = \frac{1}{36}(2)^6 - \frac{1}{36}(-4)^6 = -112$	M1 A1cso **(3)** **(7 marks)**

Question Number	Scheme	Marks
6 (a)	$y=(4x-7)^{\frac{1}{2}} \Rightarrow \left(\frac{\mathrm{d}y}{\mathrm{d}x}=\right) 2(4x-7)^{-\frac{1}{2}}$ (see notes)	M1 A1
	At $(8,5)$ gradient of tangent is $2(4\times 8-7)^{-\frac{1}{2}}\left(=\frac{2}{5}\right)$	dM1
	Equation for l is $y-5=-\frac{5}{2}(x-8)$	ddM1
	$2y-10=-5x+40 \Rightarrow 5x+2y-50=0$ *	A1*
		(5)
(b)	$\int (4x-7)^{\frac{1}{2}}\,\mathrm{d}x=\left[\frac{(4x-7)^{\frac{3}{2}}}{6}\right]$ (see notes)	M1, A1
	Complete area $=\int_{\frac{7}{4}}^{8}(4x-7)^{\frac{1}{2}}\,\mathrm{d}x=\left[\frac{(4x-7)^{\frac{3}{2}}}{6}\right]_{\frac{7}{4}}^{8}+5$	dM1
	$=\frac{155}{6}$	A1
		(4)
		(9 marks)