	point "$\left(\frac{3}{2}, -2\right)$" B1B0 if there are other unrejected answers but ignore coordinates that are clearly just part of their solution such as $\left(\frac{5}{4}, -10\right)$ from applying f($2x$)	
		(2)
		(Total 8 marks)

Question Number	Scheme	Notes	Marks
4	**"In this question you must show all stages of your working. Solutions relying on calculator technology are not acceptable."**		
	$(\sin 3x+\cos 3x)^2=\sin^2 3x+\cos^2 3x+2\sin 3x\cos 3x=1+2\sin 3x\cos 3x=1+\sin 6x$ Expands correctly and obtains an appropriate clearly integrable function: $(\sin 3x+\cos 3x)^2\rightarrow\pm1\pm\sin 6x$ (identity sign errors only). See variation below and Alt		**M1**
	$\int_{\frac{\pi}{18}}^{\frac{\pi}{12}}1+\sin 6x\ \mathrm{d}x=\left[x-\frac{\cos 6x}{6}\right]_{\frac{\pi}{18}}^{\frac{\pi}{12}}$	**d**M1: Integrates $\pm1\pm\sin 6x$ to $\pm x\pm r\cos 6x$ A1: $x-\frac{\cos 6x}{6}$ Must not be fortuitous. May have done this with more than one integral	**dM1** **A1**
	$\left(\frac{\pi}{12}-\frac{\cos\left(\frac{\pi}{2}\right)}{6}\right)-\left(\frac{\pi}{18}-\frac{\cos\left(\frac{\pi}{3}\right)}{6}\right)=\frac{\pi}{12}-\frac{\pi}{18}-0+\frac{1}{12}=\frac{\pi}{36}+\frac{1}{12}$ M1: Substitutes in the correct limits following an attempt at integration and subtracts either way round to obtain a two term expression of the form $a\pi+b,\ a,b\neq 0$ and b may be decimal. Allow slips if intention clear. If there is a substitution e.g., $u=6x$ and they do not revert to x then the changed limits must be correct e.g., $\frac{\pi}{2}$ and $\frac{\pi}{3}$ A1: Correct exact two term numerical expression. May be factorised (Isw) Must not be fortuitous.		**M1** **A1**
	An unsimplified variation on the above is to reach $\frac{1-\cos 6x}{2}+\frac{1+\cos 6x}{2}+\sin 6x$ (M1: identity sign errors only) $\Rightarrow\frac{1}{2}x-\frac{\sin 6x}{12}+\frac{1}{2}x+\frac{\sin 6x}{12}-\frac{\cos 6x}{6}$ (**d**M1A1) For the **d**M1 they must be integrating an expression that is equivalent to $\pm1\pm\sin 6x$ and they must achieve an expression that is equivalent to $\pm x\pm r\cos 6x$. Final M1 and A1 as before noting that the limits may be applied to separate terms		
			(Total 5 marks)
Alt	$(\sin 3x+\cos 3x)^2=\sin^2 3x+\cos^2 3x+2\sin 3x\cos 3x=1+2\sin 3x\cos 3x$ $\int_{\frac{\pi}{18}}^{\frac{\pi}{12}}1+2\sin 3x\cos 3x\ \mathrm{d}x=\left[x+\frac{\sin^2 3x}{3}\right]_{\frac{\pi}{18}}^{\frac{\pi}{12}}$ or $\left[x-\frac{\cos^2 3x}{3}\right]_{\frac{\pi}{18}}^{\frac{\pi}{12}}$ M1**d**M1: Obtains $\pm1\pm2\sin 3x\cos 3x$ and integrates to $\pm x\pm A\sin^2 3x$ or $\pm x\pm B\cos^2 3x$ The two M marks are awarded together here. Note that they could also use $\sin^2 3x+\cos^2 3x=\frac{1-\cos 6x}{2}+\frac{1+\cos 6x}{2}$ as in the main scheme variation A1: Correct integration		**M1** **dM1** **A1**
	$\left(\frac{\pi}{12}+\frac{\sin^2\left(\frac{\pi}{4}\right)}{3}\right)-\left(\frac{\pi}{18}+\frac{\sin^2\left(\frac{\pi}{6}\right)}{3}\right)$ or $\left(\frac{\pi}{12}-\frac{\cos^2\left(\frac{\pi}{4}\right)}{3}\right)-\left(\frac{\pi}{18}-\frac{\cos^2\left(\frac{\pi}{6}\right)}{3}\right)=....\qquad\frac{\pi}{36}+\frac{1}{12}$ M1: Substitutes in the limits following an attempt at integration and subtracts either way round to reach $a\pi+b,\ a,b\in\mathbb{R}$. Trig evaluated. b may be irrational. Allow slips if intention clear.		**M1** **A1**