

Question	Answer	Marks	Guidance
(a)	Use correct product rule or chain rule	M1	
	Obtain correct derivative in any form	A1	$\cos x \cdot \cos 2x - \sin x \cdot 2\sin 2x$
	Equate derivative to zero and use a correct double angle formula	*M1	If chain rule used then derivative set to 0 gains M1 since correct double angle formula has already been used.
	Obtain an equation in one trigonometric variable	DM1	Allow following from coefficient errors in differentiation only
	Obtain $6\sin^2 x = 1$, $6\cos^2 x = 5$ or $5\tan^2 x = 1$	A1	One of these 3 expressions
	Obtain final answer $x = 0.421$	A1	Must be 3s.f.
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Question	Answer	Marks	Guidance
(b)	State or imply $du = -\sin x \, dx$	B1	
	Using double angle formula, express integral in terms of u and du	M1	Use $\cos 2x = 2\cos^2 x - 1$
	Integrate and obtain $\pm \left(u - \frac{2}{3}u^3 \right)$	A1	
	Use limits $u = 1, u = \frac{1}{\sqrt{2}}$ in an integral of the form $au + bu^3$, where $ab \neq 0$	M1	Require both limits substituted twice in $au + bu^3$ for M1. Do not condone decimals.
	Obtain $\frac{1}{3}(\sqrt{2}-1)$ or $\frac{1}{3}\sqrt{2} - \frac{1}{3}$ or $\frac{2}{3}\left(\frac{1}{\sqrt{2}}\right)\frac{1}{3}$ or simplified equivalent	A1	ISW
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