

Question	Answer	Marks	Guidance
(a)	Use correct product rule	M1	Condone incorrect / missing chain rule
	Obtain correct derivative in any form	A1	e.g. $\frac{dy}{dx} = \sqrt{\sin x} + \frac{x \cos x}{2\sqrt{\sin x}}$ or $2y \frac{dy}{dx} = 2x \sin x + x^2 \cos x$
	Equate derivative to zero and obtain an equation in $\tan x$ or $\tan a$	M1	
	Obtain $\tan a = -\frac{1}{2}a$ correctly	A1	AG
		4	
(b)	Calculate the value of a relevant expression or pair of expressions at $a = 2$ and $a = 2.5$	M1	Must be working in radians At least one correct
	Complete the argument correctly with correct calculated values	A1	e.g. $-1 > -2.18$ and $-1.25 < -0.747$
		2	
(c)	State a suitable equation, e.g. $x = \pi - \tan^{-1}\left(\frac{1}{2}x\right)$	B1	A correct equation without subscripts or quote $\tan \theta = -\tan(\pi - \theta)$
	Using $\tan(A \pm B)$ formula, or otherwise, rearrange this as $\tan x = -\frac{1}{2}x$	B1	Complete argument correctly
		2	

Question	Answer	Marks	Guidance
(d)	Use the iterative process correctly at least once	M1	Must be working in radians
	Obtain answer $a = 2.29$	A1	
	Show sufficient iterations to 4 dp to justify 2.29 to 2 dp or show there is a sign change in the interval (2.285, 2.295)	A1	e.g. 2.25, 2.2974, 2.2871, 2.2893, 2.2888, ...
		3	