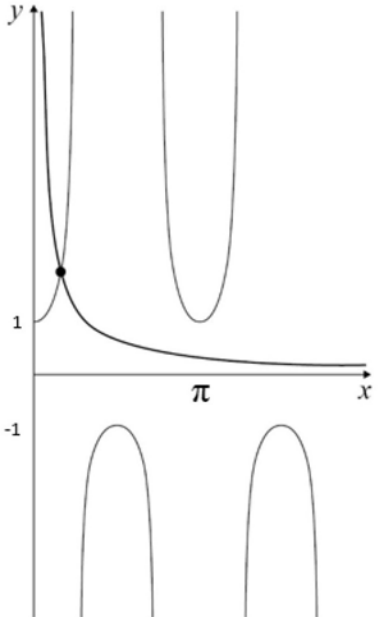


Q	Marking instructions	AO	Mark	Typical solution
7(a)	Sketches graph of $y = \frac{1}{x}$ Must not cross axes Correct asymptotes	1.2	B1	
	Sketches graph of $y = \sec kx$ up to first asymptote	1.1a	M1	
	Draws fully correct graphs in first quadrant , intersecting at one point with $\sec 2x$ up to asymptote at $x = \frac{5\pi}{4}$. Ignore fourth quadrant/negative y . Condone missing labels on y -axis.	1.1b	A1	
7(b)	Rearranges to the form $f(x) = 0$ and evaluates $f(x)$ at 0.4 and 0.6 Can evaluate at two values either side of the root 0.515 in the interval $[0.4, 0.6]$	1.1a	M1	$\frac{1}{x} = \sec 2x \Rightarrow \frac{1}{x} - \sec 2x = 0$ $f(x) = \frac{1}{x} - \sec 2x$ $f(0.4) = 1.06.. > 0$ $f(0.6) = -1.09.. < 0$ <p>Hence the solution lies between 0.4 and 0.6</p>
	Completes rigorous argument with any reference to change of sign. Must see evidence of correct evaluation accepting values correct to 1 sf. If function notation used it must be defined.	2.1	R1	
7(c)	Uses $\sec 2x = \frac{1}{\cos 2x}$ to obtain a correct equation in $\cos 2x$ eg, $\frac{1}{x} = \frac{1}{\cos 2x}$ or $1 = \frac{x}{\cos 2x}$	1.1a	M1	$\frac{1}{x} = \sec 2x$ $\frac{1}{x} = \frac{1}{\cos 2x}$ $x = \cos 2x$ $2x = \cos^{-1} x$ $x = \frac{1}{2} \cos^{-1} x$
	Completes rearrangement Must see $\cos^{-1} x = 2x$ before given answer	2.1	R1	

7 (d)(i)	Obtains any one correct value to at least 3 decimal places, ignoring labels.	1.1a	M1	$x_2 = 0.5796$ $x_3 = 0.4763$
	Obtains x_2, x_3 and x_4 correct to 4 decimal places If no labels only accept the three correct answers in the correct order with no extras seen beyond x_4 CAO	1.1b	A1	$x_4 = 0.5372$
7 (d)(ii)	Draws correct cobweb diagram Condone missing vertical line $x = 0.4$	1.1a	M1	See diagram below
	Shows positions of x_2, x_3 and x_4 with clear indication of positioning on x-axis not on $y=x$	1.1b	A1	
	Total		11	

