

Question 4 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(22 \cos t)^2 + (2\sqrt{5} \sin t)^2 = 130$	M1	This mark is given for combining the two equations to show where the curve and circle meet
	$484 (\cos t)^2 + 20(1 - \cos t)^2 = 130$	M1	This mark is given for forming an equation in $\cos t$ only
	$464 \cos^2 t = 110$	A1	This mark is given for simplifying to find an equation in terms of $\cos t$
	$\cos t = \frac{55}{232}$ $\Rightarrow t = 1.06\dots, 5.22\dots, 2.07\dots, 4.30\dots$	M1	This mark is given for finding a value for t . Note that there are four values for four intersections and we are looking for the value of t that gives a positive value for x and a negative value for y
	$x = 22 \times \sqrt{\frac{55}{232}} = 10.7$ $y = 4\sqrt{5} \times -\sin 5.22\dots = -3.91$	M1	This mark is given for a method to substitute back into the original equations to find value for x and y . Note that x has to be positive and so is the positive answer, and that there are two values of t that give the correct negative y value.
	$S = (10.7, -3.91)$	A1	This mark is given for the correct coordinates of S to 3 significant figures