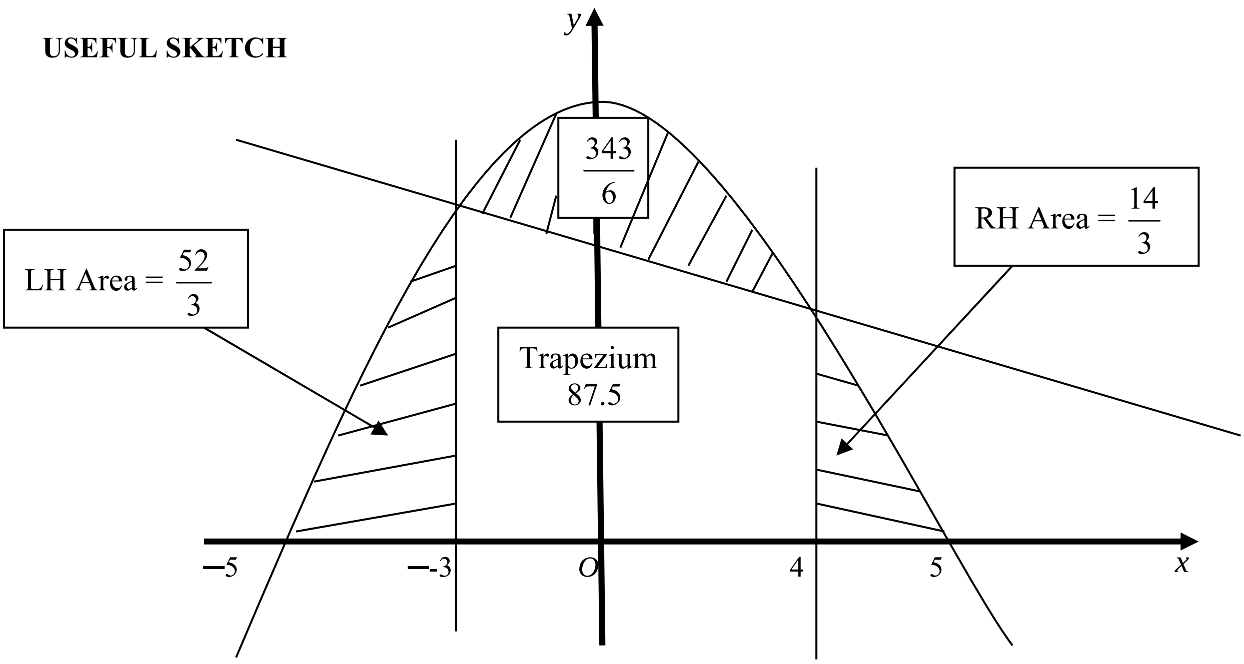
Question number	Scheme	Marks
5 (a)	$25 - x^2 = 13 - x$	M1
	$x^2 - x - 12 = 0$	
	$(x-4)(x+3) = 0$	M1
	$A = (-3, 16)$	A1
	$B = (4, 9)$	A1
		(4)
(b)	$\int_{-5}^{5}(25 - x^2)\mathrm{d}x - \left[\int_{-3}^{4}(25 - x^2)\,\mathrm{d}x - \frac{1}{2}(16+9)\times 7\right]$	M1 A1
	$\left[25x - \frac{x^3}{3}\right]_{-5}^{5} - \left\{\left[25x - \frac{x^3}{3}\right]_{-3}^{4} - 87.5\right\}$	M1 A1
		B1
	$\left(\frac{250}{3} + \frac{250}{3}\right) - \left[\left(100 - \frac{64}{3}\right) - (-75+9) - 87.5\right]$	M1
	$\frac{219}{2} = (109.5)$	A1
		(7)
		[11]
	Alternative (b)	
	$\int_{-5}^{5}(25 - x^2)\mathrm{d}x - \int_{-3}^{4}(12 - x^2 + x)\,\mathrm{d}x$	M1 A1
	$\left[25x - \frac{x^3}{3}\right]_{-5}^{5} - \left[12x - \frac{x^3}{3} + \frac{x^2}{2}\right]_{-3}^{4}$	M1 A1
		A1
	$\left(\frac{250}{3} + \frac{250}{3}\right) - \left(\frac{104}{3} + \frac{45}{2}\right)$	M1
	$\frac{219}{2} = (109.5)$	A1
		(7)

USEFUL SKETCH



Part	Mark	Additional Guidance
(a)	M1	For setting the given equation of the curve = given equation of the line $25-x^2=13-x$ and attempting to form a 3TQ $x^2-x-k=0$ (k is an integer) Ignore the absence of = 0 if further work shows that they are attempting to solve a 3TQ = 0
	M1	For attempting to solve their 3TQ See general guidance for the definition of an attempt.
	A1	For **either** $(-3,\ 16)$ or $(4,\ 9)$
	A1	For **both** $(-3,\ 16)$ and $(4,\ 9)$
(b)	There are two ways to calculate this area. In each case; The first M mark is for a correct strategy (allow ft from (a) in their limits) The first A mark (M mark in Epen) is a fully correct strategy with correct limits The second M mark is for an attempt to integrate The second A mark is for a fully correct integration – ignore limits for this mark. The B mark (and A mark in Epen) is for the area of the trapezium of 87.5 seen anywhere. The third M mark is for substituting in their limits The final A mark is the correct answer only.	
	Method 1 – Trapezium + two sides	
	M1	For an attempt at the correct strategy to find the area. Allow for this mark a correct statement with using their limits correctly. This may well be seen at the end when they combine individual areas. $(A=)\frac{1}{2}('16'+'9')\times'7'+\int_{'4'}^{'5'}(25-x^2)\ \mathrm{d}x+\int_{'-5'}^{'-3'}(25-x^2)\ \mathrm{d}x$ OR $(A=)\int_{-3}^{4}(13-x)\ \mathrm{d}x+\int_{'4'}^{'5'}(25-x^2)\ \mathrm{d}x+\int_{'-5'}^{'-3'}(25-x^2)\ \mathrm{d}x$
	A1	Fully correct expression with correct limits. $(A=)\frac{1}{2}(16+9)\times 7+\int_{4}^{5}(25-x^2)\ \mathrm{d}x+\int_{-5}^{-3}(25-x^2)\ \mathrm{d}x$ OR $(A=)\int_{-3}^{4}(13-x)\ \mathrm{d}x+\int_{'4'}^{'5'}(25-x^2)\ \mathrm{d}x+\int_{'-5'}^{'-3'}(25-x^2)\ \mathrm{d}x$
	M1	For an attempt to integrate their expression for area. (Follow General Guidance for the definition of an attempt) Ignore limits for this mark
	A1	For a fully correct integrated expression for the Area with a correct expression for the trapezium (**Ignore limits for this mark**.) $\left[13x-\frac{x^2}{2}\right],\ \left[25x-\frac{x^3}{3}\right],\ \left[25x-\frac{x^3}{3}\right]$ OR $\frac{1}{2}(16+9)\times 7,\ \left[25x-\frac{x^3}{3}\right],\ \left[25x-\frac{x^3}{3}\right]$
	B1	For the correct area of the trapezium of 87.5. Award wherever seen. $\frac{343}{6}$ seen implies B1 If not seen explicitly, this can be implied from a correct final answer. **This is an A mark in Epen**

	M1	For an attempt to substitute **their** limits into **their integrated** expression.
	A1	For the correct final area of $A=\dfrac{219}{2}$ oe
	Method 2 – Using the area under the whole curve between −5 and 5; minus the area of the curve between −4 and 3; plus the area of the trapezium	
	M1	For an attempt at the correct strategy to find the area Allow for this mark, the correct strategy with **their** limits This may well be seen at the end when they combine individual areas. $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(25-x^2)\ \mathrm{d}x+\frac{1}{2}('16'+'9')\times'7'$ OR $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(25-x^2)\ \mathrm{d}x+\int_{'-3'}^{'4'}(13-x)\ \mathrm{d}x$ OR $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(12+x-x^2)\ \mathrm{d}x$
	A1	For the correct expression with correct limits $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(25-x^2)\ \mathrm{d}x+\frac{1}{2}('16'+'9')\times'7'$ OR $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(25-x^2)\ \mathrm{d}x+\int_{'-3'}^{'4'}(13-x)\ \mathrm{d}x$ OR $(A=)\int_{-5}^{5}(25-x^2)\ \mathrm{d}x-\int_{'-3'}^{'4'}(12+x-x^2)\ \mathrm{d}x$
	M1	For an attempt to integrate their expression for area. (Follow General Guidance for the definition of an attempt) Ignore limits for this mark
	A1	For a fully correct integrated expression for the Area with a correct expression for the trapezium. Accept this seen as individual parts Ignore limits for this mark. $\left[25x-\frac{x^3}{3}\right],\ \left[25x-\frac{x^3}{3}\right],\ \left[13x-\frac{x^2}{2}\right]$ OR $\left[25x-\frac{x^3}{3}\right],\ \left[25x-\frac{x^3}{3}\right],\ \frac{1}{2}(16+9)\times 7$ OR $\left[25x-\frac{x^3}{3}\right],\ \left[12x+\frac{x^2}{2}-\frac{x^3}{3}\right]$
	B1	For the correct area of the trapezium of 87.5 $\frac{343}{6}$ seen implies B1 Award wherever seen. If not seen explicitly, this can be implied from a correct final answer. **This is an A mark in Epen**
	M1	For an attempt to substitute **their** limits into **their integrated** expression or individual parts..
	A1	For the correct final area of $A=\dfrac{219}{2}$ oe