

Question	Scheme	Marks	AOs
1 (a)	$\text{Area}(R) \approx \frac{1}{2} \times 0.5 \times \left[0.5 + 2(0.6742 + 0.8284 + 0.9686) + 1.0981 \right]$	B1	1.1b
		<u>M1</u>	1.1b
	$\left\{ = \frac{1}{4} \times 6.5405 = 1.635125 \right\} = 1.635 \text{ (3 dp)}$	A1	1.1b
		(3)	
(b)	Any valid reason, for example • Increase the number of strips • Decrease the width of the strips • Use more trapezia between $x = 1$ and $x = 3$	B1	2.4
		(1)	
(c)(i)	$\left\{ \int_1^3 \frac{5x}{1 + \sqrt{x}} \, dx \right\} = 5("1.635") = 8.175$	B1ft	2.2a
(c)(ii)	$\left\{ \int_1^3 \left(6 + \frac{x}{1 + \sqrt{x}} \right) dx \right\} = 6(2) + ("1.635") = 13.635$	B1ft	2.2a
		(2)	

(6 marks)

Question 1 Notes:			
(a)			
B1:	Outside brackets $\frac{1}{2} \times 0.5$ or $\frac{0.5}{2}$ or 0.25 or $\frac{1}{4}$		
M1:	For structure of trapezium rule [.....].		
	No errors are allowed, e.g. an omission of a y -ordinate or an extra y -ordinate or a repeated y -ordinate.		
A1:	Correct method leading to a correct answer only of 1.635		
(b)			
B1:	See scheme		
(c)			
B1:	8.175 or a value which is $5 \times$ their answer to part (a)		
	Note: Allow B1ft for 8.176 (to 3 dp) which is found from $5(1.63125) = 8.175625$		
	Note: Do not allow an answer of 8.1886... which is found directly from integration		
(d)			
B1:	13.635 or a value which is $12 +$ their answer to part (a)		
	Note: Do not allow an answer of 13.6377... which is found directly from integration		