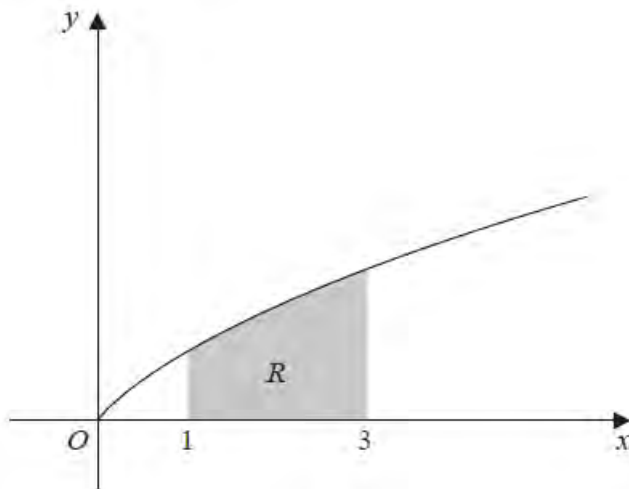


1.



**Figure 1**

Figure 1 shows a sketch of the curve with equation  $y = \frac{x}{1 + \sqrt{x}}$ ,  $x \geq 0$ .

The finite region  $R$ , shown shaded in Figure 1, is bounded by the curve, the line with equation  $x = 1$ , the  $x$ -axis and the line with equation  $x = 3$ .

The table below shows corresponding values of  $x$  and  $y$  for  $y = \frac{x}{1 + \sqrt{x}}$ .

$x$	1	1.5	2	2.5	3
$y$	0.5	0.6742	0.8284	0.9686	1.0981

- (a) Use the trapezium rule, with all the values of  $y$  in the table, to find an estimate for the area of  $R$ , giving your answer to 3 decimal places. (3)
- (b) Explain how the trapezium rule can be used to give a better approximation for the area of  $R$ . (1)
- (c) Giving your answer to 3 decimal places in each case, use your answer to part (a) to deduce an estimate for

(i)  $\int_1^3 \frac{5x}{1 + \sqrt{x}} dx$ ,      (ii)  $\int_1^3 6 + \frac{x}{1 + \sqrt{x}} dx$ .

(2)

**(Total for Question 1 is 6 marks)**