

6.

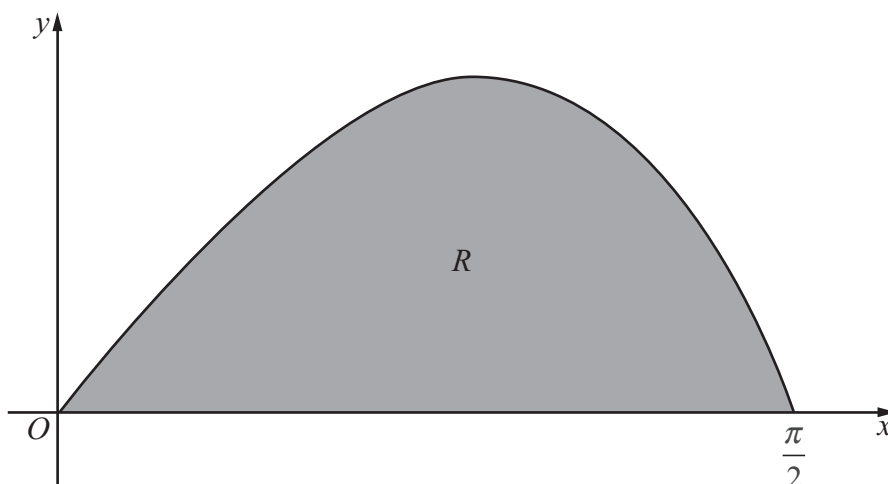


Figure 3

Figure 3 shows a sketch of the curve with equation $y = \frac{2 \sin 2x}{(1 + \cos x)}$, $0 \leq x \leq \frac{\pi}{2}$.

The finite region R , shown shaded in Figure 3, is bounded by the curve and the x -axis.

The table below shows corresponding values of x and y for $y = \frac{2 \sin 2x}{(1 + \cos x)}$.

x	0	$\frac{\pi}{8}$	$\frac{\pi}{4}$	$\frac{3\pi}{8}$	$\frac{\pi}{2}$
y	0		1.17157	1.02280	0

- (a) Complete the table above giving the missing value of y to 5 decimal places. (1)
- (b) Use the trapezium rule, with all the values of y in the completed table, to obtain an estimate for the area of R , giving your answer to 4 decimal places. (3)
- (c) Using the substitution $u = 1 + \cos x$, or otherwise, show that

$$\int \frac{2 \sin 2x}{(1 + \cos x)} dx = 4 \ln(1 + \cos x) - 4 \cos x + k$$

where k is a constant. (5)

- (d) Hence calculate the error of the estimate in part (b), giving your answer to 2 significant figures. (3)



