7. The curve C has equation

$$y = \sqrt{16\sin\left(\frac{\pi\,(x-1)}{6}\right)} \qquad 1 \leqslant x \leqslant 7$$

(a) Using this equation, complete the table below giving the values of y to 3 decimal places.

x	1	2.2	3.4	4.6	5.8	7
y	0		3.901	3.901		0

(1)

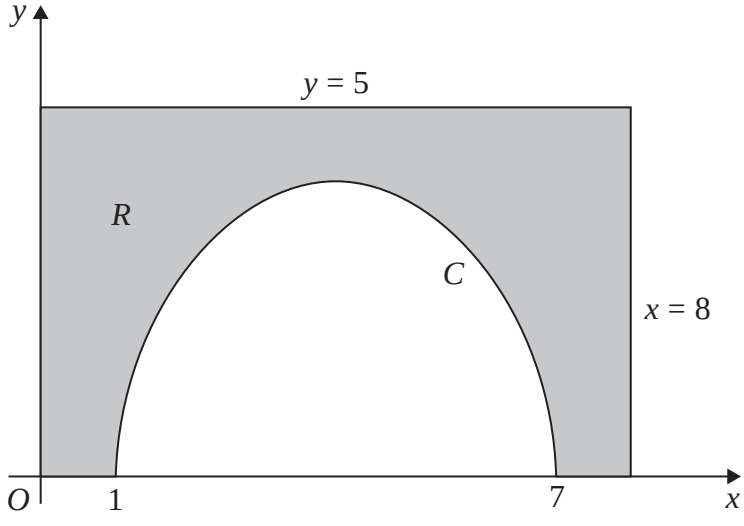

Figure 3

The region R, shown shaded in Figure 3, is bounded by the curve C, the x-axis, the y-axis, the line with equation $x = 8$ and the line with equation $y = 5$

(b) Using the trapezium rule with all the values of y from your completed table, estimate the area of R. Give your answer to 3 decimal places.

(4)

(c) Explain how the trapezium rule can be used to give a more accurate estimate for the area of R.

(1)

(d) State whether the answer to part (b) is an underestimate or an overestimate of the area of R. Justify your answer fully.

(2)