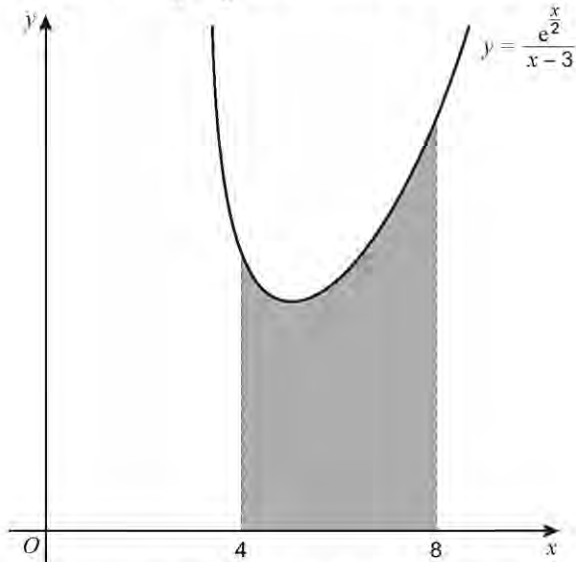


6

The curve with equation $y = \frac{e^{\frac{x}{2}}}{x-3}$ is shown in the diagram.



The region shaded is bounded by the curve, the x -axis, and the lines $x = 4$ and $x = 8$

The trapezium rule with six ordinates (5 strips) is to be used to find an approximate value for the area of the shaded region.

Some of the values required to obtain this approximation are shown in the table below.

x	4	4.8	5.6	6.4	7.2	8
y	7.3891	6.1240	6.3249		8.7139	10.9196

6 (a) (i) Find the y -value that is missing from the table. [1 mark]

6 (a) (ii) Use the trapezium rule with six ordinates (5 strips) to find an approximate value for the area of the shaded region.

Give your answer to five significant figures. [3 marks]

6 (b) A student finds an improved approximation for the area of the shaded region by using the trapezium rule with 11 ordinates.

The student correctly obtains 29.759 as their improved approximation.

The student claims that the exact area must be greater than 29.759

Without further calculation, explain whether or not the student is correct.

[2 marks]