



Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = f(x)$

The table below shows corresponding values of x and y for this curve between $x = 0.5$ and $x = 0.9$

The values of y are given to 4 significant figures.

x	0.5	0.6	0.7	0.8	0.9
y	1.632	1.711	1.786	1.859	1.930

(a) Use the trapezium rule, with all the values of y in the table, to find an estimate for

(a) $\int_a^b y \, dx$ where $h = \frac{b-a}{n}$

$\approx \frac{1}{2} h [(y_0 + y_n) + 2(y_1 + \dots + y_{n-1})]$

$\int_{0.5}^{0.9} f(x) \, dx$ (a) contd. $h = \text{strip width} = \frac{0.9-0.5}{4} = 0.1$ (1 mark)

Integrate, $I \approx \frac{0.1}{2} [(1.632 + 1.930) + 2(1.711 + 1.786 + 1.859)]$ (1 mark)

Give your answer to 3 significant figures.

$= 0.7137 = 0.714$ 3sf (1 mark)

(b) Using your answer to part (a), deduce an estimate for

$\int_{0.5}^{0.9} (3f(x) + 2) \, dx$ (3)

(b) $\int_{0.5}^{0.9} 3f(x) + 2 \, dx = 3 \int_{0.5}^{0.9} f(x) + \int_{0.5}^{0.9} 2 \, dx$

$\approx (3 \times 0.7137) + [2x]_{0.5}^{0.9}$ (1 mark)

$= 2.1411 + (2(0.9) - 2(0.5))$ (1 mark)

$= 2.9411 = 2.94$ 3sf (1 mark)

