CAB

Analysis

Use calculator

Question 8

Let R be the region bounded by the graph of $y = \ln x$ and the line $y = 2x - 3$.

(a) Find the area of R.

(b) Find the volume of the solid generated when R is rotated about the horizontal line $y = -3$.

(c) Write, but do not evaluate, an expression involving one or more integrals that can be used to find the volume of the solid generated when R is revolved about the y-axis.

$\ln x = 2x - 3 \Rightarrow \quad A = 0.05565, \quad B = 1.79154$	1: limits in (a) or (b)
(a) $\int_A^B \left(\ln x - (2x-3)\right) dx \approx 1.471$	3: 1: limits; 1: integrand; 1: answer
(b) Volume = $\pi \int_A^B \left((\ln x + 3)^2 - (2x)^2\right) dx = 18.783$	2: 1: integrand; 1: answer
(c) Volume = $\pi \int_{2A-3}^{2B-3} \left(\left(\frac{y+3}{2}\right)^2 - \left(e^y\right)^2\right) dy$	3: 1: limits; 1: integrand; 1: answer