

5. The curve C has equation

$$y = x\sqrt{(x^3 + 1)}, \quad 0 \leq x \leq 2.$$

(a) Complete the table below, giving the values of y to 3 decimal places at $x = 1$ and $x = 1.5$.

x	0	0.5	1	1.5	2
y	0	0.530			6

(2)

(b) Use the trapezium rule, with all the y values from your table, to find an approximation for the value of $\int_0^2 x\sqrt{(x^3 + 1)} dx$, giving your answer to 3 significant figures.

(4)

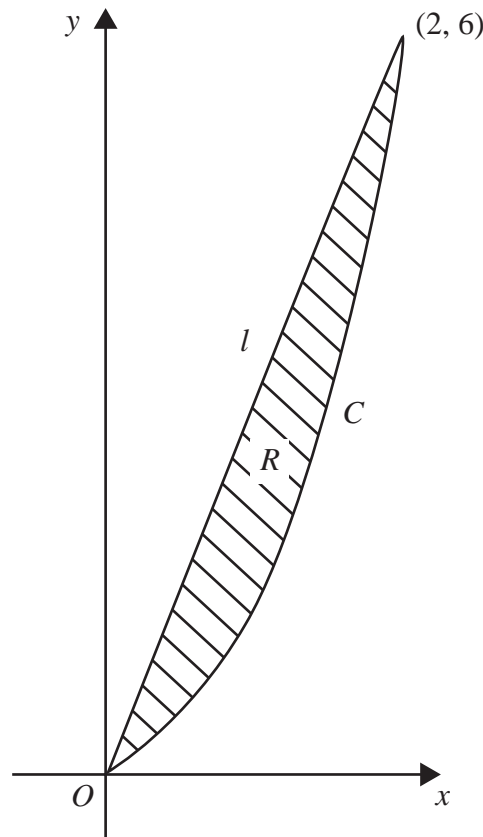


Figure 2

Figure 2 shows the curve C with equation $y = x\sqrt{(x^3 + 1)}, 0 \leq x \leq 2$, and the straight line segment l , which joins the origin and the point $(2, 6)$. The finite region R is bounded by C and l .

(c) Use your answer to part (b) to find an approximation for the area of R , giving your answer to 3 significant figures.

(3)



9. (a) Sketch, for $0 \leq x \leq 2\pi$, the graph of $y = \sin\left(x + \frac{\pi}{6}\right)$. (2)

(b) Write down the exact coordinates of the points where the graph meets the coordinate axes. (3)

(c) Solve, for $0 \leq x \leq 2\pi$, the equation

$$\sin\left(x + \frac{\pi}{6}\right) = 0.65,$$

giving your answers in radians to 2 decimal places. (5)



