

C4 Parametric Integration

Mostly stolen from the Smedley, Wiseman textbook.

1. A curve is given by $x = 3t - 1, y = t^2 + 1$. Calculate the area of the region enclosed by the curve and the x -axis between the lines $x = 2$ and $x = 8$. □
2. A curve is given by $x = t + 2, y = t^3 - 3$. Calculate the area of the region enclosed by the curve and the x -axis between the lines $x = 4$ and $x = 6$. □₅₄
3. A curve is given by $x = 6t - t^3, y = 2 + t^2$. Calculate the area of the region under the curve between the point where $t = -1$ and the point where $t = 1$. □
4. (a) Find the area of the finite region, R , bounded by the curve $x = 2t + 1, y = t^2 - 3$, the lines $x = 3$ and $x = 7$, and the x -axis. □
(b) Find also the volume of solid generated when R is rotated through 360° about the x -axis. □
5. (a) Find the area of the finite region, R , bounded by the curve $x = 1 + 2t, y = 1 + \sqrt{t}$, the lines $x = 1$ and $x = 9$, and the x -axis. □ _{$\frac{56}{3}$}
(b) Find also the volume of solid generated when R is rotated through 360° about the x -axis. □ _{$\frac{136\pi}{3}$}
6. Sketch the curve, C , with parametric equations $x = 4t, y = \frac{2}{t^2}$. The region R is bounded by C , the lines $x = 2$ and $x = 4$ and the x -axis.
(a) Find the area of the finite region R . □₈
(b) Find also the volume of solid generated when R is rotated through 360° about the x -axis. □ _{$\frac{112\pi}{3}$}