



QUESTION WORKBOOK

Areas, parametric curves and the limit of a sum

Integration · Year 12–13

6 questions · 20 marks

PRINT EDITION

SECTION A · Warm-up

A1 Find the area enclosed between the line $y = x$ and the curve $y = x^2$. [3]

SECTION B · Standard

B1 Find the area enclosed between the curves $y = 9 - x^2$ and $y = x^2 + 1$. [4]

B2 The curve $x = t^3$, $y = 3t^2$ is traced for $t \geq 0$. Find the area under the curve from $t = 0$ to $t = 2$, and verify your answer by converting to Cartesian form. [4]

- B3** Write the limit, as $\delta x \rightarrow 0$, of the sum $\sum x^2 \delta x$ taken over strips from $x = 1$ to $x = 3$, as an integral, and evaluate it. [3]

SECTION C · Stretch

- C1** The curve $x = 3 \cos t$, $y = \sin t$ for $0 \leq t \leq \pi/2$ is a quarter of an ellipse. Show that the area under it is $3\pi/4$. [4]

- C2** Explain why the integral sign is a stretched letter S. [2]
