# THE DEFINITE INTEGRAL AND THE AREA UNDER A CURVE

**1** Write the definite integral that you would use to find the area of the region under the line $y = x + 2$ between the ordinates $x = 0$ and $x = 3$. By using appropriate area formulae, find the value of this area.

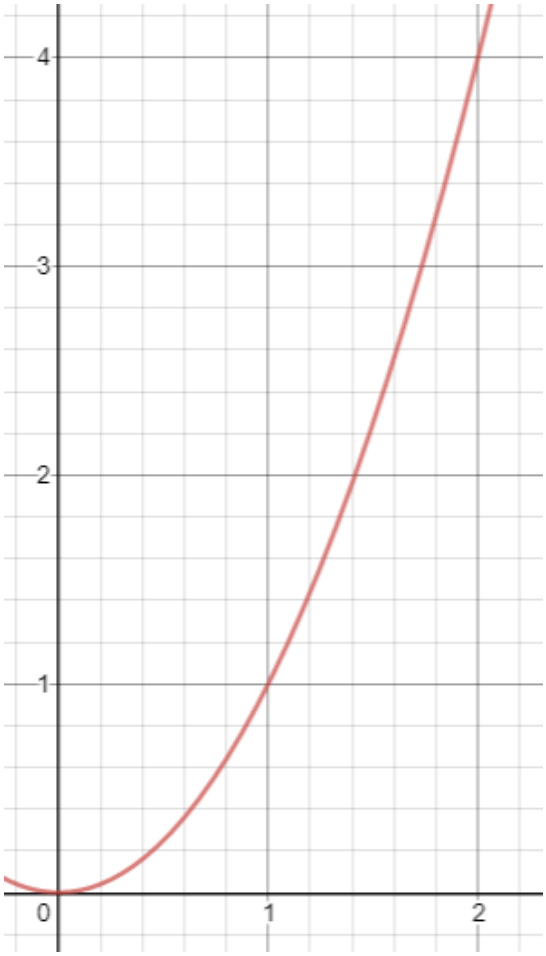
**2** Write the definite integral for the area of the region under the line $y = 2x + 1$ between $x = 1$ and $x = 4$. By using appropriate area formulae, find the value of this area.

**3** Which definite integral represents the area bounded by the curve $y = 4 - x^2$ and the $x$-axis?

**A** $\int_0^2 (4 - x^2)\,dx$ **B** $\int_{-2}^0 (4 - x^2)\,dx$ **C** $\int_{-2}^2 (4 - x^2)\,dx$ **D** $\int_{-\sqrt{2}}^{\sqrt{2}} (4 - x^2)\,dx$

**4** Write the definite integral for the area of the region bounded by the lines $y = 3x$, $x = t$ and the $x$-axis. By using appropriate area formulae, find the value of this area.

**5** Write the definite integral for the area of the region under the curve $y = x^2$ between $x = 0$ and $x = 2$. By drawing this graph on a 5 mm grid, count squares to find an approximation for this area.



**7** Write the definite integral for the area of the region under the curve $y = \sqrt{9 - x^2}$. By using appropriate area formulae, find the value of this area.

**8** Write the definite integral for the area of the region under the curve $y = \sqrt{9-(x-2)^2}$. By using appropriate area formulae, find the value of this area.