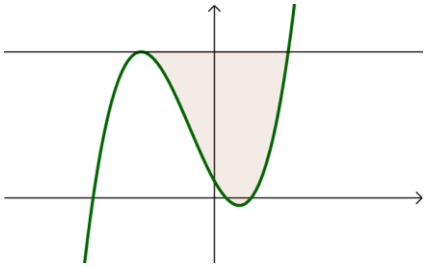
Section 1: Finding areas

Exercise level 2

1. (i) Sketch the graph of $y = \sqrt{9 - x}$, showing the points where the graph meets the coordinate axes.
   (ii) Find the area of the region bounded by the curve $y = \sqrt{9 - x}$ and the coordinate axes.

2. The diagram below shows the curve $y = x^3 + 2x^2 - 4x + 1$ and the line $y = k$.



   (i) Find the coordinates of the point where the line touches the curve, and hence state the value of *k*.
   (ii) Find the coordinates of the other point where the line crosses the curve.
   (iii) Find the area of the shaded region.

3. Find the area enclosed between the graphs $y = x^2 + 1$ and $y = 2x + 1$.

4. Find the area enclosed between the graphs $y = x^2$ and $y = x^3$.

5. (i) Find the coordinates of the points where the graph $y = x^3 - x^2 - 4x + 4$ crosses the coordinate axes, and sketch the curve.
   (ii) Sketch the curve $y = x^3 - x$ on the same axes.
   (iii) Find the points of intersection of the curves.
   (iv) Find the area between the graphs.