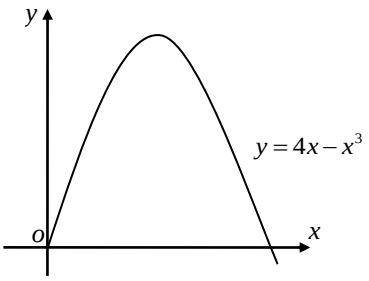
Integration (JTB)

1. Find: **(a)** $\int (9x^2+6x)\ dx$ **(b)** $\int (3x-1)^2\ dx$ **(c)** $\int (3x^2+\frac{2}{x^3})\ dx$

2. Evaluate each of the following definite integrals:

(a) $\int_{-1}^{2} (2x+4)\ dx$ **(b)** $\int_{4}^{9} (\sqrt{x})\ dx$

3. Find the area in the first quadrant bounded by the curve $y = 4x - x^3$ and the x - axis .



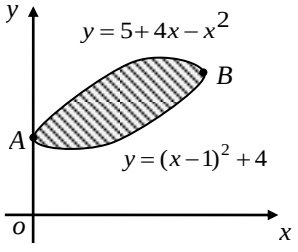
4. **(a)** Find $\int_{-1}^{2} (x^2-1)\ dx$

(b) Find the area between the curve given by $f(x)=x^2-1$ and the x-axis from $x = -1$ to $x = 2$

(c) Explain, with the aid of a sketch, why these do not give the same answer.

5. A curve has as its derivative $\frac{dy}{dx}=2-12x$.
Given that the point (1, 3) lies on this curve, express y in terms of x.

6. The cross-sectional area of a ship's hydro-foil is shown in the diagram opposite with rectangular axes having been added. The top surface has as its equation $y = 5+4x-x^2$ and the lower surface $y = (x-1)^2+4$.



(a) Establish the coordinates of A and B, the points of intersection of the two curves.

(b) Hence calculate the cross-sectional area of the hydro-foil in square units.