

3 Evaluate  $\int_0^{\frac{2}{3}} (3x-2)^3 dx$ .

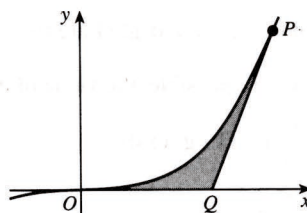
4 Find  $\int_0^4 \sqrt{2x+1} dx$ .

5 (a) Find  $\int \left( \frac{1}{x^3} + x^3 \right) dx$ . (b) Evaluate  $\int_0^8 \frac{1}{\sqrt[3]{x}} dx$ .

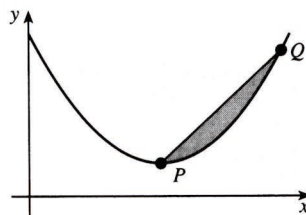
6 Find the area of the region enclosed between the curve  $y = 12x^2 + 30x$  and the  $x$ -axis.

7 Given that  $\int_{-a}^a 15x^2 dx = 3430$ , find the value of the constant  $a$ .

8 The diagram shows the curve  $y = x^3$ . The point  $P$  has coordinates  $(3, 27)$  and  $PQ$  is the tangent to the curve at  $P$ . Find the area of the region enclosed between the curve,  $PQ$  and the  $x$ -axis.



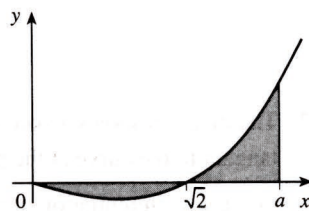
9 The diagram shows the curve  $y = (x-2)^2 + 1$  with minimum point  $P$ . The point  $Q$  on the curve is such that the gradient of  $PQ$  is 2. Find the area of the region, shaded in the diagram, between  $PQ$  and the curve.



10 Evaluate  $\int_0^2 x(x-1)(x-2) dx$  and explain your answer with reference to the graph of  $y = x(x-1)(x-2)$ .

11 (a) Find  $\int x(x^2 - 2) dx$ .

(b) The diagram shows the graph of  $y = x(x^2 - 2)$  for  $x \geq 0$ . The value of  $a$  is such that the two shaded regions have equal areas. Find the value of  $a$ . (OCR)



12 Given that  $\int_1^p (8x^3 + 6x) dx = 39$ , find two possible values of  $p$ . Use a graph to explain why there are two values.

13 Show that the area enclosed between the curves  $y = 9 - x^2$  and  $y = x^2 - 7$  is  $\frac{128\sqrt{2}}{3}$ .



