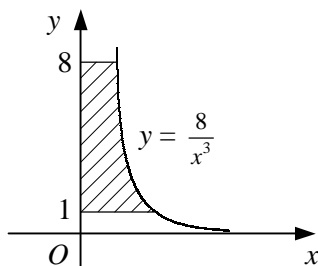


INTEGRATION

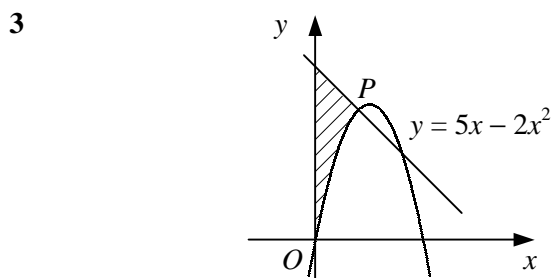
- 1 $f(x) \equiv 3 + 4x - x^2$.
- Express $f(x)$ in the form $a(x + b)^2 + c$, stating the values of the constants a , b and c .
 - State the coordinates of the turning point of the curve $y = f(x)$.
 - Find the area of the region enclosed by the curve $y = f(x)$ and the line $y = 3$.

- 2 a Evaluate $\int_1^2 \frac{8}{x^3} dx$.



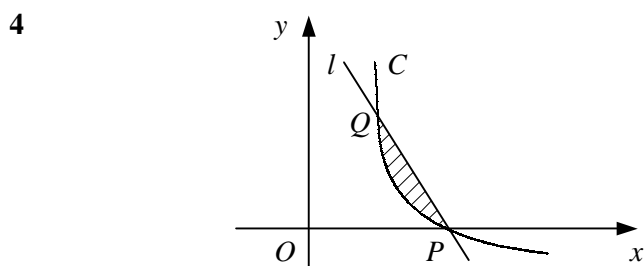
The diagram shows the curve with the equation $y = \frac{8}{x^3}$, $x > 0$.

- Using your answer to part a, find the area of the shaded region bounded by the curve, the lines $y = 1$ and $y = 8$ and the y -axis.



The diagram shows the curve $y = 5x - 2x^2$ and the normal to the curve at the point $P(1, 3)$.

- Find an equation of the normal to the curve at P .
- The shaded region is bounded by the curve, the normal to the curve at P and the y -axis.
- Show that the area of the shaded region is $\frac{5}{3}$.



The diagram shows the curve C with the equation $y = \frac{4-x^2}{x^2}$, $x > 0$, and the straight line l .

- Find the coordinates of the point P where C crosses the x -axis.
- The line l has gradient -3 and intersects C at the points P and Q .
- Find the coordinates of the point Q .
 - Show that the area of the shaded region enclosed by C and l is $\frac{1}{2}$.