

14 The equation of a curve is $y = \frac{16}{x^2} + \frac{3}{x}$.

(a) Determine the coordinates of the point where the curve cuts the x -axis. [2]

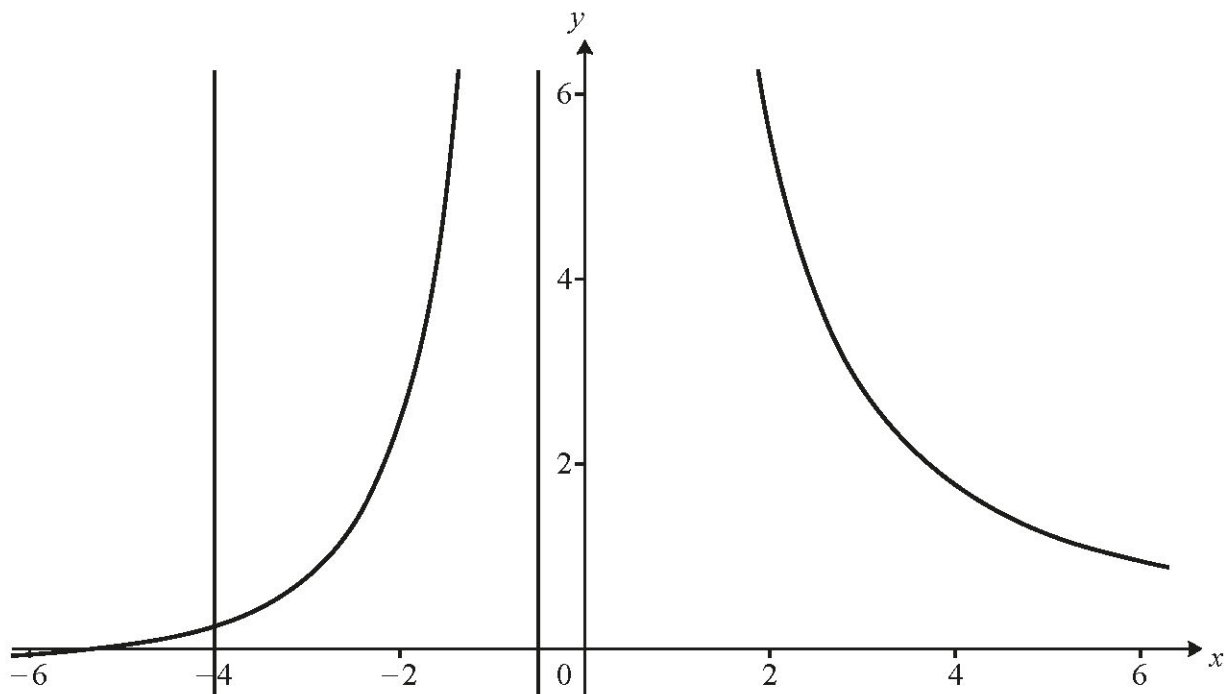
(b) (i) Find $\frac{dy}{dx}$. [2]

(ii) Hence determine the exact coordinates of the stationary point on the curve $y = \frac{16}{x^2} + \frac{3}{x}$. [2]

(c) (i) Find $\frac{d^2y}{dx^2}$. [2]

(ii) Hence determine the set of values of x for which the curve $y = \frac{16}{x^2} + \frac{3}{x}$ is concave downwards. [2]

The diagram shows parts of the curve $y = \frac{16}{x^2} + \frac{3}{x}$, the line $x = -4$ and the line $x = -\frac{1}{2}$.



(d) Determine the exact area bounded by the curve $y = \frac{16}{x^2} + \frac{3}{x}$, the x -axis and the lines $x = -4$ and $x = -\frac{1}{2}$. Give your answer in the form $a + b \ln 2$, where a and b are constants to be determined. [5]