

**3** A curve is such that  $\frac{dy}{dx} = 6x^2 + \frac{k}{x^3}$  and passes through the point  $P(1, 9)$ . The gradient of the curve at  $P$  is 2.

**(i)** Find the value of the constant  $k$ . [1]

**(ii)** Find the equation of the curve. [4]