

**12** A function is defined by  $f(x) = x^3 - x$ .

**(a)** By considering  $\frac{f(x+h) - f(x)}{h}$ , show from first principles that  $f'(x) = 3x^2 - 1$ . **[4]**

**(b)** Sketch the gradient function  $f'(x)$ . **[2]**

**(c)** Show that the curve  $y = f(x)$  has a single point of inflection which is not a stationary point. **[3]**