

7 The gradient of the curve  $y = f(x)$  is given by the differential equation

$$(2x-1)^3 \frac{dy}{dx} + 4y^2 = 0$$

and the curve passes through the point  $(1, 1)$ . By solving this differential equation show that

$$f(x) = \frac{ax^2 - ax + 1}{bx^2 - bx + 1},$$

where  $a$  and  $b$  are integers to be determined.